

OWNER'S MANUAL

Unitary Air Conditioner
INVERTER

Thank you for choosing our product.

For proper operation, please read and keep this manual carefully.

If you have lost the Owner's Manual, please contact the local agent or visit

www.borealintl.com or sent email to borealsales@borealintl.com for electronic version.

ENVBR24HPJ1IB

ENVBR36HPJ1IB

ENVBR48HPJ1IB

ENVBR60HPJ1IB

To Users

Thank you for selecting our product. Please read this instruction manual carefully before installing and using the product, so as to master and correctly use the product. In order to guide you to correctly install and use our product and achieve expected operating effect, we hereby instruct as below:

- (1) This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.
- (2) In order to ensure reliability of product, the product may consume some power under stand-by status for maintaining normal communication of system and preheating refrigerant and lubricant. If the product is not to be used for long, cut off the power supply; please energize and preheat the unit in advance before reusing it.
- (3) Please properly select the model according to actual using environment; otherwise it may impact the using convenience.
- (4) This product can't be installed at corrosive, inflammable or explosive environment or the place with special requirements, such as kitchen. Otherwise, it will affect the normal operation or shorten the service life of the unit, or even cause fire hazard or serious injury. As for above special places, please adopt special air conditioner with anti-corrosive or anti-explosion function.
- (5) If the product needs to be installed, moved or maintained, please contact our designated dealer or local service center for professional support. Users should not disassemble or maintain the unit by themselves, otherwise it may cause relative damage, and our company will bear no responsibilities.
- (6) All the illustrations and information in the instruction manual are only for reference. In order to make the product better, we will continuously conduct improvement and innovation. If there is adjustment in the product, please subject to actual product.
- (7) If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.

- (8) Boreal assumes no responsibility for personal injury, property loss or equipment damage caused by improper installation and commissioning, unnecessary maintenance, or not following relevant national rules and regulations, industrial standards and requirements in this instruction manual.

Exception Clauses

Manufacturer will bear no responsibilities when personal injury or property loss is caused by the following reasons:

- (1) Damage the product due to improper use or misuse of the product.
- (2) Alter, change, maintain or use the product with other equipment without abiding by the instruction manual of manufacturer.
- (3) After verification, the defect of product is directly caused by corrosive gas.
- (4) After verification, defects are due to improper operation during transportation of product.
- (5) Operate, repair, maintain the unit without abiding by instruction manual or related regulations.
- (6) After verification, the problem or dispute is caused by the quality specification or performance of parts and components that produced by other manufacturers.
- (7) The damage is caused by natural calamities, bad using environment or force majeure.

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This marking indicates that this product should not be disposed with other household wastes throughout the EU. To prevent possible harm to the environment or human health from uncontrolled waste disposal, recycle it responsibly to promote the sustainable reuse of material resources. To return your used device, please use the return and collection systems or contact the retailer where the product was purchased. They can take this product for environmental safe recycling.



1 Safety Precautions

WARNING

This product can't be installed at corrosive, inflammable or explosive environment or the place with special requirements, such as kitchen. Otherwise, it will affect the normal operation or shorten the service life of the unit, or even cause fire hazard or serious injury. As for above special places, please adopt special air conditioner with anti-corrosive or anti-explosion function.

Improper installation, adjustment, alteration, service, maintenance, or use can cause explosion, fire, electrical shock, or other conditions which may cause death, personal injury, or property damage. Consult a qualified installer, service agency, or your distributor or branch for information or assistance. The qualified installer or agency must use factory--authorized kits or accessories when modifying this product. Refer to the individual instructions packaged with the kits or accessories when installing. Follow all safety codes. Wear safety glasses, protective clothing, and work gloves. Use quenching cloth for brazing operations. Have fire extinguisher available. Read these instructions thoroughly and follow all warnings or cautions included in literature and attached to the unit. Consult local building codes and National Electrical Code (NEC) for special requirements. Recognize safety information. This is the safety--alert symbol .

When you see this symbol on the unit and in instructions or manuals, be alert to the potential for personal injury. Understand these signal words: **DANGER**, **WARNING**, **CAUTION** and **NOTICE**. These words are used with the safety--alert symbol.

 **DANGER** Indicates a hazardous situation that, if not avoided, will result in death or serious injury.

 **WARNING** Indicates a hazardous situation that, if not avoided, could result in death or serious injury.

 **CAUTION** Indicates a hazardous situation that, if not avoided, may result in minor or moderate injury.

NOTICE Indicates important but not hazard-related information, used to indicate risk of property damage.

WARNING

Electrical shock hazard:

Failure to follow this warning could result in personal injury or death.

Before installing, modifying, or servicing system, main electrical disconnect switch must be in the OFF position. There may be more than 1 disconnect switch. Lock out and tag switch with a suitable warning label.

WARNING

PROPOSITION 65:

Respirable particles of fiberglass are known to State of California to cause cancer. This appliance contains fiberglass insulation.

California Proposition 65 warnings are required for certain products, which are not covered by the OSHA standards. All manufacturer products meet current federal OSHA Guidelines for safety.

Products that contain or produce any of the more than 600 listed chemicals known in California can cause cancer or birth defects, such as fiberglass insulation, lead in brass and natural gas combustion products. Warnings are issued for such products sold in California as required by California Proposition 65.

All “new equipment” shipped for sale in California will have labels stating that the product contains and /or produces Proposition 65 chemicals. We cannot always know “when, or if” products will be sold in the California market. Although we have not changed our processes, having the same label on all our products facilitates manufacturing and shipping.

WARNING

All phases of this installation must conform to NATIONAL, STATE AND LOCAL CODES. If it is required for additional information, please contact your local distributor.

WARNING

The unit must be permanently grounded. Failure to do so can lead to electrical shock causing personal injury or death.

WARNING

The material of plenum and ductwork must meet the standard NFPA 90B.

The supply air plenum or duct must have a solid sheet metal bottom piece directly after the air handler unit with no openings, registers or flexible air ducts located in it. The first 6 inches of supply air plenum and ductwork must be constructed of sheet

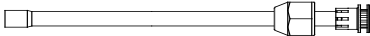
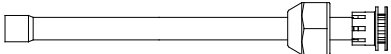
metal as required by NFPA 90B. Metal plenum of duct may be connected to the non-combustible floor base for downflow. Exposing combustible non-metal. material to the supply opening of a downflow unit can cause a fire resulting in property damage, personal injury or death. If flexible supply air ducts are used they may be located only in the side walls of the rectangular plenum, a minimum of 6 inches from the solid bottom.

2 Product Introduction

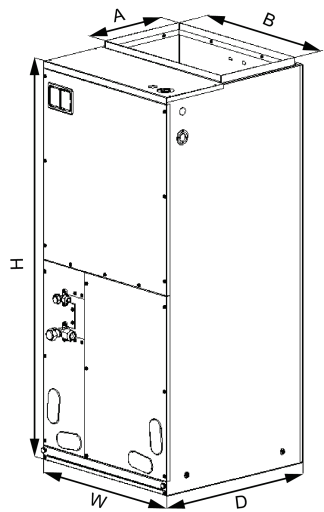
2.1 Product Description

The Boreal air handler offer the perfect combination of superior product quality, operating efficiency, operating sound levels and value for money. The condensing unit uses the environmentally friendly refrigerant R410A, which is chlorine-free to help prevent damage to the ozone layer.

2.2 Optional Accessories

Indoor unit accessories				
No.	Name	Appearance	Q'ty	Usage
1	Throw-over pipe		1	Connect the unit with the liquid pipe
2	Throw-over pipe		1	Connect the unit with the gas pipe

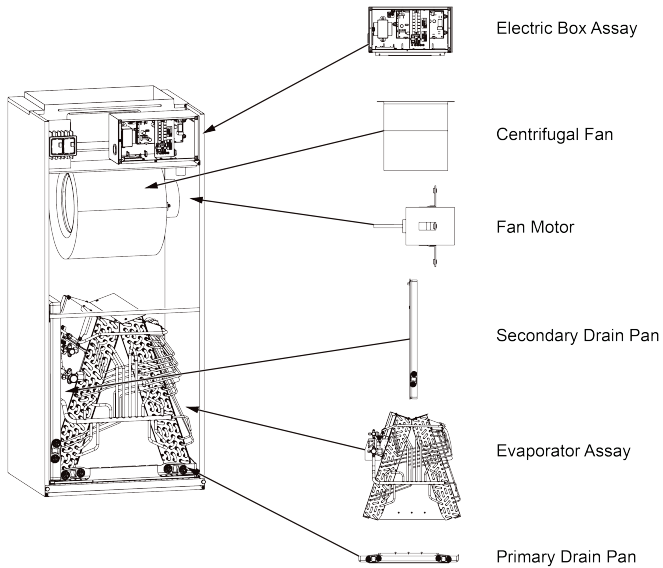
2.3 Physical Dimension



Unit: inch(mm)

Model	Dimension				
	W	D	H	A	B
ENVBR24HPJ1IB ENVBR36HPJ1IB	21-1/4(540)	21-1/4(540)	48-1/4(1224)	11-5/8(295)	20(508)
ENVBR48HPJ1IB ENVBR60HPJ1IB	24-3/4(630)	21-1/4(540)	57(1448)	11-5/8(295)	20(508)

2.4 Names of Main Parts



2.5 General Information

Model	Cooling capacity(ton)	Optional electric heater (kW)
ENVBR24HPJ1IB	2.0	5/8/10
ENVBR36HPJ1IB	3.0	5/8/10
ENVBR48HPJ1IB	4.0	10/15/20
ENVBR60HPJ1IB	5.0	10/15/20

Model	Motor @ 230V ~, 60Hz	
	HP	FLA
ENVBR24HPJ1IB ENVBR36HPJ1IB	1/2	2.1
ENVBR48HPJ1IB ENVBR60HPJ1IB	1	3.2

Unit: mm

Model	Filter size
ENVBR24HPJ1IB ENVBR36HPJ1IB	490×516×15
ENVBR48HPJ1IB ENVBR60HPJ1IB	525×516×15

NOTES:

- ①. Based upon W/nominal tonnage, dry coil and filter should be installed.
- ②. Use 0.96 as approximate SCFM correction factor for wet coil.

2.6 Dip switch configuration

Set the indoor fan speed through the eight dip switches of the indoor main control board. The higher level, the higher speed of the indoor unit fan. Operation Instruction is below:

Dip switch settings must be completed before power on the unit.

After the unit is shut down or stopped at the temperature point, the indoor unit will delay for a few minutes and then shut down. The refrigeration can realize the drying function, relieve the mold of the air duct, and the heating can blow the waste heat and relieve the heat accumulation in the air duct.

During installation and debugging, pay attention to check whether the temperature controller has set the fan delay and shutdown time. If the temperature controller has been set, the actual delay and shutdown time of the fan is equal to the temperature controller setting time plus the fan delay time of the indoor unit.

Model	Level	Heat (SA2)				Cool (SA1)			
ENVBR24HPJ1IB	Level 1	1	0	0	0	0	0	0	0
	Level 2	1	0	0	1	0	0	0	0
	Level 3	1	0	1	0	0	0	0	0
	Level 4-Default	1	0	1	1	0	0	0	0
	Level 5	1	1	0	0	0	0	0	0
	Level 6	1	1	0	1	0	0	0	0
	Level 7	1	1	1	0	0	0	0	0
	Level 8	1	1	1	1	0	0	0	0
ENVBR36HPJ1IB	Level 1	0	0	0	0	0	0	0	0
	Level 2	0	0	0	1	0	0	0	0
	Level 3	0	0	1	0	0	0	0	0
	Level 4-Default	0	0	1	1	0	0	0	0
	Level 5	0	1	0	0	0	0	0	0
	Level 6	0	1	0	1	0	0	0	0
	Level 7	0	1	1	0	0	0	0	0
	Level 8	0	1	1	1	0	0	0	0

Model	Level	Heat (SA2)				Cool (SA1)			
ENVBR48HPJ1IB	Level 1	1	0	0	0	0	0	0	0
	Level 2	1	0	0	1	0	0	0	0
	Level 3	1	0	1	0	0	0	0	0
	Level 4-Default	1	0	1	1	0	0	0	0
	Level 5	1	1	0	0	0	0	0	0
	Level 6	1	1	0	1	0	0	0	0
	Level 7	1	1	1	0	0	0	0	0
	Level 8	1	1	1	1	0	0	0	0
ENVBR60HPJ1IB	Level 1	0	0	0	0	0	0	0	0
	Level 2	0	0	0	1	0	0	0	0
	Level 3	0	0	1	0	0	0	0	0
	Level 4-Default	0	0	1	1	0	0	0	0
	Level 5	0	1	0	0	0	0	0	0
	Level 6	0	1	0	1	0	0	0	0
	Level 7	0	1	1	0	0	0	0	0
	Level 8	0	1	1	1	0	0	0	0

NOTE: 0 means dip switch to 'on', 1 means dip switch to number.

2.7 Fan Performance Data

External static pressure should stay within the minimum and maximum limits shown in the table below in order to ensure proper operation of both cooling, heating, and electric heating operation.

Model	ENVBR24HPJ1IB											
Level	Static pressure(Inches W.C.)											
	0	0.1	0.15	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
Speed 1(CFM)	1030	900	840	-	-	-	-	-	-	-	-	-
Speed 2(CFM)	1080	960	900	840	-	-	-	-	-	-	-	-
Speed 3(CFM)	1220	1120	1060	990	850	-	-	-	-	-	-	-
Speed 4(CFM)	1390	1290	1240	1180	1070	960	-	-	-	-	-	-
Speed 5(CFM)	1580	1490	1440	1390	1290	1180	1090	970	830	-	-	-
Speed 6(CFM)	1720	1640	1600	1550	1450	1360	1250	1130	960	-	-	-
Speed 7(CFM)	1800	1730	1680	1630	1550	1460	1370	1270	1150	970	830	
Speed 8(CFM)	1850	1820	1790	1740	1660	1580	1500	1410	1340	1200	1080	930

Air Handlers

Model	ENVBR36HPJ1IB											
Level	Static pressure(Inches W.C.)											
	0	0.1	0.15	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
Speed 1(CFM)	1150	1050	950	880	-	-	-	-	-	-	-	-
Speed 2(CFM)	1200	1100	1000	940	850	-	-	-	-	-	-	-
Speed 3(CFM)	1380	1260	1200	1100	950	-	-	-	-	-	-	-
Speed 4(CFM)	1550	1460	1390	1310	1160	1010	830	-	-	-	-	-
Speed 5(CFM)	1710	1650	1600	1560	1480	1400	1310	1210	1080	930	-	-
Speed 6(CFM)	1840	1800	1750	1710	1640	1590	1500	1420	1330	1220	1100	960
Speed 7(CFM)	1870	1830	1810	1800	1760	1690	1620	1520	1440	1350	1250	1150
Speed 8(CFM)	1900	1860	1840	1830	1790	1720	1660	1600	1540	1440	1320	1220

Model	ENVBR48HPJ1IB											
Level	Static pressure(Inches W.C.)											
	0	0.1	0.15	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
Speed 1(CFM)	1640	1500	1450	1350	-	-	-	-	-	-	-	-
Speed 2(CFM)	1680	1560	1500	1380	1300	-	-	-	-	-	-	-
Speed 3(CFM)	1810	1690	1620	1550	1380	-	-	-	-	-	-	-
Speed 4(CFM)	1930	1830	1770	1710	1580	1430	1280	-	-	-	-	-
Speed 5(CFM)	2200	2110	2040	1980	1860	1720	1620	1490	1380	-	-	-
Speed 6(CFM)	2240	2190	2145	2100	2010	1870	1750	1615	1500	1380	-	-
Speed 7(CFM)	2280	2240	2200	2180	2130	2080	2000	1880	1750	1600	1420	-
Speed 8(CFM)	2300	2260	2220	2190	2140	2090	2040	1980	1930	1800	1700	1550

Model	ENVBR60HPJ1IB											
Level	Static pressure(Inches W.C.)											
	0	0.1	0.15	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
Speed 1(CFM)	1660	1540	1470	1400	-	-	-	-	-	-	-	-
Speed 2(CFM)	1850	1720	1650	1600	1400	-	-	-	-	-	-	-
Speed 3(CFM)	1920	1800	1730	1650	1480	1315	-	-	-	-	-	-
Speed 4(CFM)	2110	2000	1950	1860	1760	1640	1490	1325	-	-	-	-
Speed 5(CFM)	2250	2200	2190	2140	2040	1930	1800	1670	1520	1370	-	-
Speed 6(CFM)	2260	2220	2200	2170	2090	2010	1910	1760	1650	1550	1430	1380
Speed 7(CFM)	2300	2260	2230	2200	2150	2115	2050	1990	1920	1840	1750	1660
Speed 8(CFM)	2320	2280	2250	2230	2190	2140	2080	2040	2000	1950	1920	1890

NOTE: Please refer to above table for fan speed selection, and '-' is not allowed to be used.

3 Preparative for Installation

3.1 Pre-Installation Instruction

3.1.1 Checking Product Received

After receiving the product, please check if there is any damage caused by transportation. Shipping damage is the responsibility of the carrier. Verify the model number, specifications and accessories are correct prior to installation. The distributor or manufacturer will not accept claims from dealers for transportation damage or installation of incorrectly shipped units.

3.1.2 Before Installation

Carefully read all instructions for the installation prior to installing product. Make sure each step or procedure is understood and any special considerations are taken into account before starting installation. Assemble all tools, hardware and supplies needed to complete the installation. Some items may need to be purchased locally. Make sure everything needed to install the product is on hand before starting.

3.1.3 Codes & Regulations

This product is designed and manufactured to comply with national codes. It is installer's responsibilities to install the product in accordance with such codes and/or any prevailing local codes/regulations. The manufacturer assumes no responsibilities for equipment installed in violation of any codes or regulations.

3.1.4 Replacement Parts

When reporting shortages or damages, or ordering repair parts, give the complete product model and serial numbers as stamped on the product. Replacement parts for this product are available through your contractor or local distributor.

3.2 Important Safety Instructions

Recognize safety symbols, words, and labels

The following symbols and labels are used throughout this manual to indicate immediate or potential hazards. It is the owner's responsibility to read and comply with all safety information and instructions accompanying these symbols. Failure to heed safety information increases the risk of serious personal injury or death, property damage and/or product damage.

⚠ DANGER Immediate hazards which will result in property damage, product damage, severe personal injury or death.

⚠ WARNING Hazards or unsafe practices could result in property damage, product damage, severe personal injury or death.

NOTICE Hazards or unsafe practices which may result in property damage, product damage, severe personal injury or death.

⚠ WARNING Before serving or installing this equipment. The electrical power to this unit must be in the “off” position. Caution, more than one disconnect may exist. Failure to observe this warning may result in an electrical shock that can cause personal injury or death.

⚠ WARNING

The United States Environmental Protection Agency (“EPA”) has issued various regulations regarding the introduction and disposal of refrigerants introduced into this unit. Failure to follow these regulations may harm the environment and can lead to the imposition of substantial fines. These regulations may vary due to the passage of laws. A certified technician must perform the installation and service of this product. Should questions arise, contact your local EPA office.

⚠ WARNING

Due to high system pressure and electrical shock in potential, installation and service work can be dangerous. Only trained and qualified persons are permitted to install or service this equipment. Observe all warnings contained in this manual and labels/tags attached to the equipment.

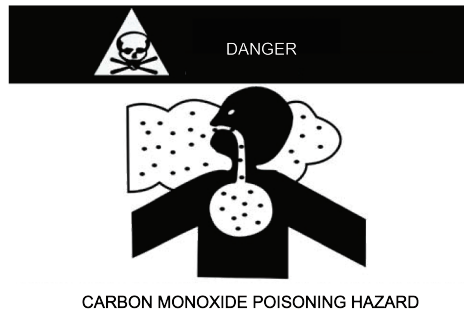
⚠ WARNING

This product is factory shipped for use with a 208/230V-1Ph-60Hz electrical power supply. This air handler must not be reconfigured to operate with any other power supply.

⚠ WARNING

The unit must have an uninterrupted, unbroken electric grounding to minimize the possibility of personal injury if an electric fault occurs. The electric grounding circuit may consist of an appropriate sized power cord which connected with the grounding piece located in the unit control box and also connecting to the building electric service panel. Other methods of grounding are permitted if performed in accordance with the “National Electric Code” (NEC)/ “American National Standards Institute” (ANSI)/ “National Fire

Protection Association" (NFPA) 70 and local/state codes. In Canada, electric grounding conforms to the Canadian electric code CSA c22.1. Failure to observe this warning can result in electrical shock that can cause personal injury.



Special warning for installation of furnaces or air handling units in enclosed areas, such as garages, utility rooms or parking areas.

Carbon monoxide producing devices (such as an automobile, space heater, gas water heater, etc.) should not be operated in enclosed areas such as unventilated garages, utility rooms or parking areas because of the danger of carbon monoxide (CO) poisoning resulting from the exhaust emissions. If a furnace or air handler is installed in an enclosed area such as a garage, utility room or parking area and a carbon monoxide producing device is operated therein, there must be adequate ventilation directly to outside.

This ventilation is necessary to avoid the danger of CO poisoning which can occur if a carbon monoxide producing device continues to operate in the enclosed area. Carbon monoxide emission can be (re)circulated throughout the building if the furnace or air handler is operating in any mode.

CO can cause serious illness including permanent brain damage or death.

4 Installation

4.1 Unit Inspection

Upon delivery, inspect the unit for damage. Any damage must be reported immediately to the carrier. Do not install such an equipment damaged by freight which determines the integrity and safety of the unit.

Please check the equipment model number to ensure the unit is appropriately sized for the condensing unit.

If an incorrect unit is supplied, it must not be installed and it is to be returned to the supplier. The manufacturer assumes no responsibility for the installation of incorrectly delivered units. The evaporator coil contains high-pressure inert gas for holding charge.

4.2 Location

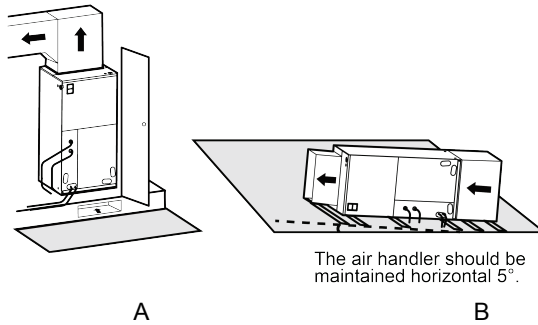
⚠ WARNING This air handler is designed for indoor installation only. Do not install it outdoors.

When installing the air handler, take consideration to minimize the length of refrigerant tubing as much as possible. Do not install the air handler in a location either above or below the condenser that violates the instructions provided with the condenser. Service clearance is to take precedence. Allow a minimum of 24" in front of the unit for service clearance. When installing in an area directly over a finished ceiling (such as an attic), an emergency drain pan is required directly under the unit. See local and state codes for requirements. When installing this unit in an area that may become wet, elevate the unit with a sturdy, non-porous material. In installations that may lead to physical damage (i.e. a garage) it is advised to install a protective barrier to prevent such damage.

This air handler is designed for a complete supply and return ductwork system. Do not operate this product without all ductwork attached.

Based upon the actual conditions, if air handler is installed as Fig. A, the air handler should be concealed in a specific room or space and make sure the air handler is not accessible to the general public.

Based upon the actual conditions, if air handler is installed as Fig. B, make sure that there is enough space for care and maintenance and the height between the air handler and ground is above 2500mm. And the air handler is not accessible to the general public. And the air handler should be maintained horizontal 5° angle to ensure smooth drainage.



4.3 Piping Work

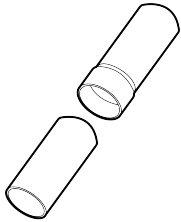
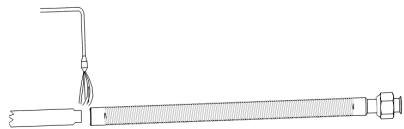
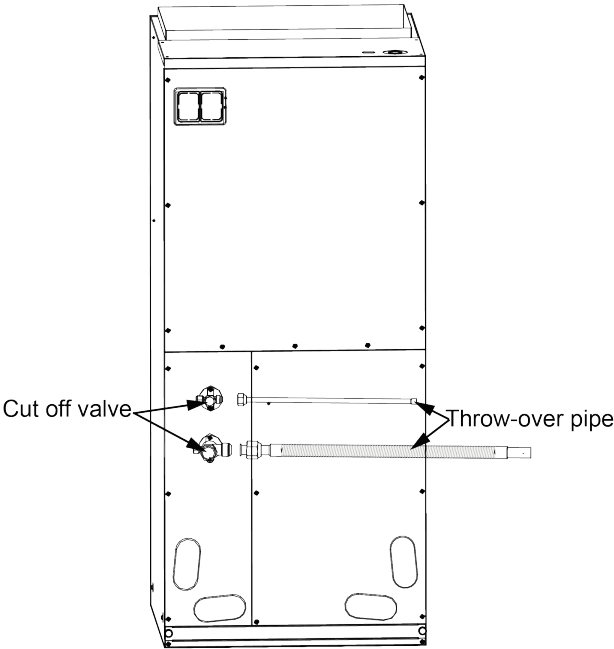
4.3.1 Specification of Connection Pipe

Model	External diameter (inch)	
	Gas pipe	Liquid pipe
ENVBR24HPJ11B ENVBR36HPJ11B ENVBR48HPJ11B ENVBR60HPJ11B	$\Phi 3/4$	$\Phi 3/8$

4.3.2 Piping Preparation

4.3.2.1 Solder Connection

All cut ends are to be round, burr free, and cleaned. Failure to follow this practice increases the chances for refrigerant leakage.

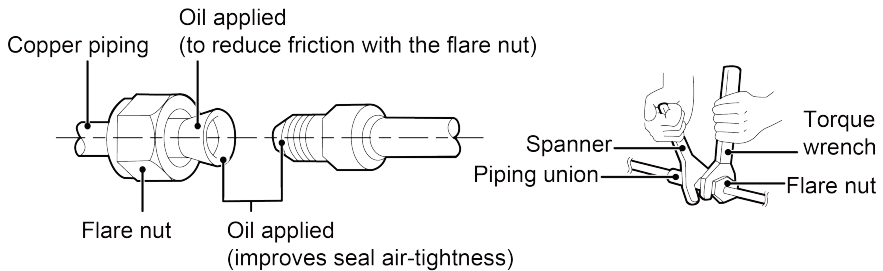


Line set size matches service valve connector



Do not crimp service valve connector when pipe is smaller than connector

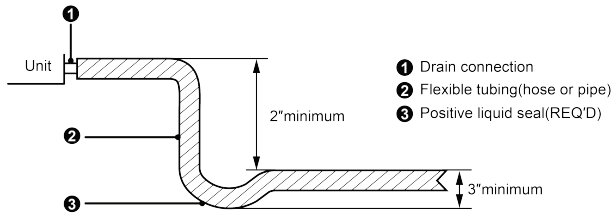
4.3.2.2 Screw Connection



Pipe diameter (inch)	Tightening torque (N·m)
Φ1/4	15-30
Φ3/8	35-40
Φ1/2	45-50
Φ5/8	60-65
Φ3/4	70-75
Φ7/8	80-85

4.4 Condensate Removal

- (1) It is not allowed to connect the condensate drain pipe into waste pipe or other pipelines which are likely to produce corrosive or peculiar smell to prevent the smell from entering indoors or corrupt the unit.
- (2) It is not allowed to connect the condensate drain pipe into rain pipe to prevent rain water from pouring in and cause property loss or personal injury.
- (3) Condensate drain pipe should be connected into special drain system for air conditioner.
- (4) The drain pan has primary and secondary drain connection. Condensate removal is performed by attaching a 3/4" PVC pipe to the evaporator coil pan and terminated in accordance with local or state Plumbing/HVAC codes. The installation must include a "P" style trap that is located closely to the evaporator coil. Do not over-tighten the drain connection in order to prevent possible damage to the evaporator drain pan. See the following figure for details of a typical condensate line "P" trap.



4.5 Ductwork

This air handler is designed for a complete supply and return ductwork system.

⚠ WARNING

Field ductwork must meet the National Fire Protection Association NFPA 90A, NFPA 90B and any applicable local ordinance.

Sheet metal ductwork run in unconditioned spaces must be insulated and covered with a vapor barrier. Fibrous ductwork may be used if constructed and installed in accordance with SMACNA Construction Standard on Fibrous Glass Ducts. Ductwork must comply with National Fire Protection Association as tested by U/L Standard 181 for Class I Air Ducts. Check local codes for requirements on ductwork and insulation.

Duct system must be designed within the range of external static pressure the unit is designed to operate against. It is important that the system airflow be adequate. Make sure supply and return ductwork, grills, special filters, accessories, etc. are accounted for in total resistance. See fan performance data in this manual.

Do not operate the unit without all ductwork completed.

Do not operate this product without all ductwork attached.

Inadequate ductwork that restricts airflow can result in improper performance and compressor or heater failure. Ductwork is to be constructed in a manner that limits restrictions and maintains suitable air velocity. Ductwork is to be sealed to the unit in a manner that will prevent leakage.

Return ductwork: Do not terminate the return ductwork in an area that can introduce toxic or objectionable fumes/odors into the ductwork. The return ductwork is to be introduced into the air handler bottom (up flow configuration).

Return Air Filters: Each installation must include a return air filter. This filtering may be performed at the air handler or externally such as a return air filter grille.

4.6 Electric Heater

The air handlers listed in this manual do not have factory installed electric heat.

Electric heat is available as an accessory. Please refer to installation instructions provided with heater kit for the correct installation procedure.

⚠ WARNING Refer to the “Electric heater kits installation” section of this manual and the instructions provided with the heater kit for the correct installation procedure.

⚠ WARNING The electrical characteristics of the air handler, the electric heater kit, and the supply power should be identical. This air handler does not have factory installed electric heater. Electric heater is available as an accessory. If installing this option, the only heater kits that can be used are the series as indicated below. It is forbidden to use the electric heater other than those recommended.

⚠ WARNING Installation and debugging when attention to verify the switch sequence of electrical heating and fan, ensure the fan must be turned on when electric heating operation and ensure the electric heating is turned off before the fan to avoid unsafe.

⚠ WARNING Refer to the “Fan Performance Data” section of this manual, otherwise it is possible to cause an exception and dry risk of electric heating.

4.6.1 Electric Heater Kits Available

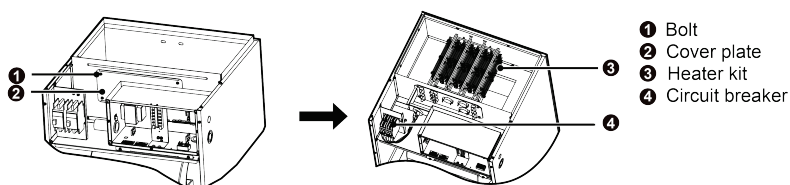
SN.	Kit	Description	Ref. air handler use(ton)
1	21-4227-00	Circuit breaker, 5kW heat strip	2.0/3.0
2	21-4216-00	Circuit breaker, 8kW heat strip	2.0/3.0
3	21-4216-01	Circuit breaker, 10kW heat strip	2.0/3.0/4.0/5.0
4	21-4217-00	Circuit breaker, 15kW heat strip	4.0/5.0
5	21-4228-00	Circuit breaker, 20kW heat strip	4.0/5.0

4.6.2 Electric Heater Kits Installation

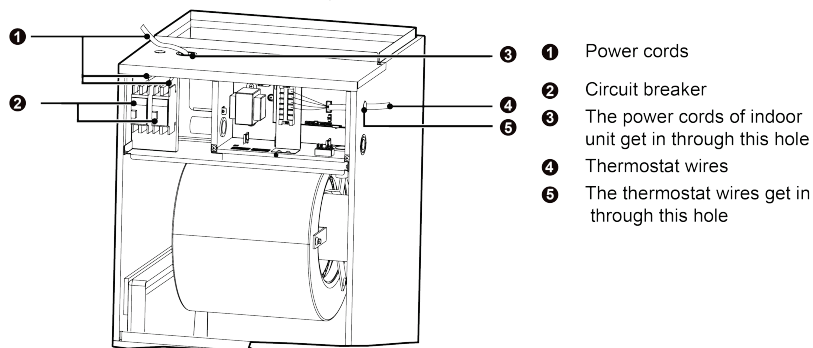
⚠ CAUTION

- (1) Ensure that all power supply is disconnected prior to installing the heater kit.
- (2) A means of strain relief and conductor protection must be provided at the supply wire entrance into cabinet.
- (3) Use copper conductors only.
- (4) Installation must follow national electric code and other applicable codes.
- (5) If this appliance is installed in an enclosed area such as a garage or utility room with any carbon monoxide producing appliance, ensure the area is properly ventilated.

- 1) Refer to the Table for appropriate heater kit.
- 2) Check any physical damage, do not install damaged heater kit.
- 3) Remove the upper access panel from air handler.
- 4) Remove cover plate from air handler.
- 5) Slide the heater kit in to the slot and secure element plate with previously removed screws.
- 6) Insert power leads into the circuit breaker lugs or stripped red and black wires (for heater kit without circuit breaker) and tighten.
- 7) Connect ground wire to ground lug.
- 8) Knock off appropriate area of the plastic circuit breaker cover on the access panel of the air handler. Knock off the holes according to the actual installation number and positions of circuit breakers. If circuit breaker is not installed, do not knock off the holes; otherwise, electric shock may occur.
- 9) Replace access panel and check operation.



- 10) Connection of power cords and thermostat wires.



4.7 Electrical Installation

4.7.1 Requirement and Notice on Electrical Installation

WARNING

The electrical installation for the air conditioner should observe the following requirements:

- ①. The electrical installation must be conducted by professionals in compliance with local laws and regulations and the instructions in this manual. Never extend the power cords. The electric circuit must be equipped with a circuit breaker and air switch both with sufficient capacity.
- ②. The unit's operating power must be within the nominal range stated in the instruction manual. Use a specialized power circuit for the air conditioner. Do not draw power from another power circuit.
- ③. The air conditioner circuit should be at least 1.5m away from any inflammable surface.
- ④. The external power cords, the thermostat wires and thermostat must be effectively fixed.
- ⑤. The external power cords, the thermostat wires and thermostat can't directly contact any hot objects. For example: they must not contact chimney pipes, warm gas pipes or other hot objects.
- ⑥. The external power cords, the thermostat wires and thermostat must not be squeezed. Never pull, stretch or bend the wires.
- ⑦. The external power cords, the thermostat wires and thermostat must not collide with any metal beam or edge on the ceiling, or touch any metal burrs or sharp metal edge around.
- ⑧. Connect wires correspondingly by referring to the circuit diagram labeled on the unit or electric box. Screws must be tightened up. Slipped screws must be replaced by specialized flat-head screws.
- ⑨. Please use the power cables that are delivered along with the air conditioner. Do not change the power cables arbitrarily. Do not change the length and terminals of the power cables. If you want to change the power cables, please contact Boreal's local service center.
- ⑩. Wiring terminals should be connected firmly to the terminal board. Loose connection is forbidden.

- ⑪. After the electrical installation is finished, please use wire clamps to secure the power cords and the thermostat wires. Make sure the wires are not clamped too tight.
- ⑫. The wire gauge of power cord should be large enough. Damaged power cords or other wires must be replaced by specialized wires. Wiring work must be done according to national wiring rules and regulations.

4.7.2 Electrical Parameters

Model	Power supply	Minimum circuit ampacity (A)	Maximum overcurrent protection (A)
ENVBR24HPJ11B ENVBR36HPJ11B	208/230V-1Ph-60Hz	4	15
ENVBR48HPJ11B ENVBR60HPJ11B		8	

NOTICE

- ①. Fuse is located on the main board.
- ②. Install a circuit breaker at every power terminal near the units (indoor unit and thermostat) with at least 3mm contact gap. The units must be able to be plugged or unplugged.
- ③. Circuit breaker and power cord specifications listed in the above table are determined based on the maximum power input of the units.
- ④. Specifications of circuit breaker are based on a working condition where the working temperature is 40°C. If working condition changes, please adjust the specifications according to national standards.
- ⑤. Adopt 5pc of AWG18 power cords to be the communication cords between indoor unit and thermostat. The maximum length is 30m. Please select a proper length according to local conditions. Communication cords must not be twisted together.
- ⑥. The wire gauge of communication cord should not be less than AWG18. It's recommended to use AWG18 power cords as the communication cords.

4.7.3 Connection of Power Cords and Thermostat Wires

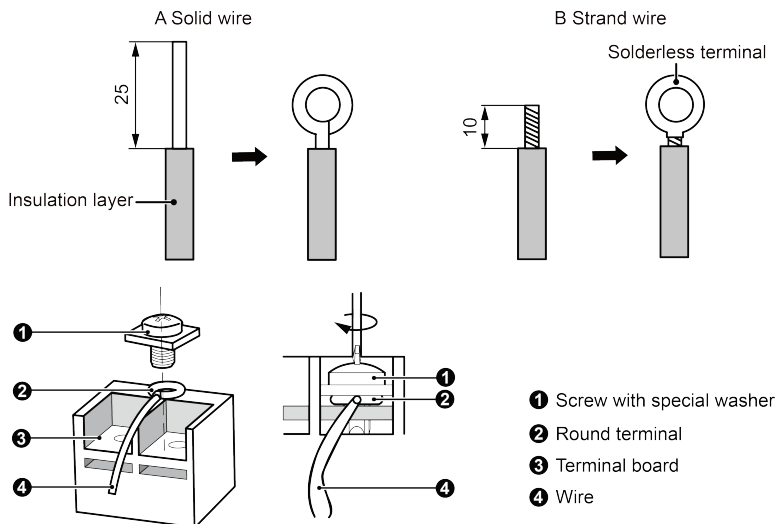
(1) For solid wires (as shown below):

- 1) Use wire cutters to cut off the wire end and then peel away about 25mm of the insulation layer.
- 2) Use a screwdriver to unscrew the terminal screw on the terminal board.
- 3) Use nippers to bend the solid wire into a ring that fits the terminal screw.
- 4) Form a proper ring and then put it on the terminal board. Use a screwdriver to tighten up the terminal screw.

(2) For strand wires (as shown below):

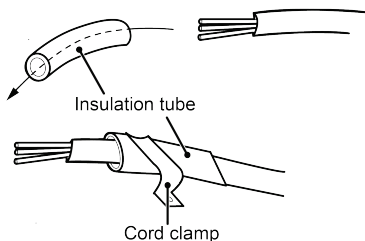
- 1) Use wire cutters to cut off the wire end and then peel away about 10mm of the insulation layer.
- 2) Use a screwdriver to unscrew the terminal screw on the terminal board.
- 3) Use a round terminal fastener or clamp to fix the round terminal firmly on the peeled wire end.
- 4) Locate the round terminal conduit. Use a screwdriver to replace it and tighten up the terminal screw (as shown below).

Unit:mm



(3) How to connect the thermostat wires and power cords.

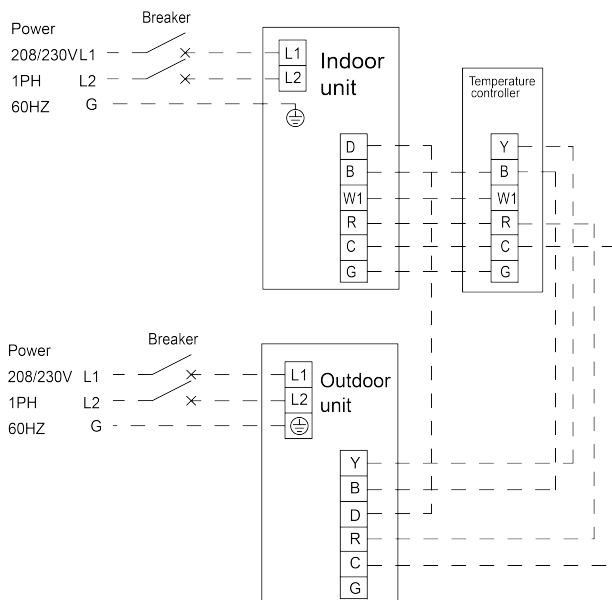
Lead the thermostat wires and power cords through the insulation tube. Then fix the wires with wire clamps (as shown in the following figure.)



⚠ WARNING

- ①. Before working, please check whether the indoor unit and thermostat are powered on.
- ②. Match the terminal numbers and wire colors with the colors indicated in the indoor unit.
- ③. Wrong wire connection may burn the electrical components.
- ④. Connect the wires firmly to the wiring box. Incomplete installation may lead to fire hazard.
- ⑤. Please use wire clamps to secure the external covers of connecting wires. (Insulators must be clamped securely; otherwise, electric leakage may occur.)
- ⑥. Ground wire should be connected.

Wires of indoor unit (Only for air handler without electric heater)



NOTE: Y means Compressor control signal for the outdoor unit;

B which is energized under the heating mode means 4-way valve control signal;

D means defrosting signal;

R means 24V AC power supply;

C means 24V common;

G means indoor unit fan signal for the indoor unit;

W1 means heater control signal.

NOTE: For cooling only unit, there is no need to connect the B and D terminals.

NOTE: When outdoor defrosts, D of outdoor unit will send 24V signal to avoid cold winds.

NOTE: When the electric heating operate, the indoor unit is forced to open the indoor unit fan.

WARNING

- ①. High and low voltage wires should be led through different rubber rings of the electric box cover.
- ②. Do not bundle up the thermostat wires or lay them side by side, otherwise errors will occur.
- ③. High and low voltage wires should be secured separately. Secure the former ones with big clamps and the latter ones with small clamps.
- ④. Use screws to tighten up the thermostat wires and power cords of unit on the terminal board. Wrong connection may lead to fire hazard.
- ⑤. If the thermostat wires of unit and power cords are not correctly connected, the air conditioner may get damaged.
- ⑥. Ground the unit through connecting the ground wire.
- ⑦. The units should comply with applicable local and national rules and regulations on power consumption.
- ⑧. When connecting the power cords, make sure the phase sequence of the power supply matches with the corresponding terminals, otherwise the compressor will get reversed and operate abnormally.

5 Installation Check and Trial Run

5.1 Checking Items after Installation

Items to be checked	Problems might happen due to improper installation	Check
Check if each parts of the unit have been installed reliably.	The unit might fall off, vibrate or emit noise.	
Check if the unit has passed through leakage test.	It may cause deficiency of cooling (heating) capacity.	
Check if the unit has been insulated properly.	It may cause condensation and water drop.	
Check if the water can be drained fluently.	It may cause condensation and water drop.	
Check if the power voltage accords with that on the nameplate.	Malfunction might happen and parts might be burned.	
Check if the wiring and pipe line has been installed correctly.	Malfunction might happen and parts might be burned.	
Check if the unit has been earthed soundly.	Hazard of electricity leakage.	
Check if the wiring conforms to the wire gage.	Malfunction might happen and parts might be burned.	
Check if there is obstruction blocking the air inlet/outlet.	It may cause deficiency of cooling (heating) capacity.	
Check if the piping length and refrigeration charging volume has been recorded.	Uncertain about the refrigerant charging volume.	
Check if the piping connection and valves have been set properly.	It may cause unit abnormality and damage the unit.	
Make sure there is no crack among air return and supply pipe.	It may cause air leak, vibration and noise.	
Check if the panel is mounted firmly.	It may cause air leak, vibration and condensation.	

5.2 Trial Run

5.2.1 Preparative for Trial Run

- (1) Never power on the unit until all the installation work has been done.
- (2) All the control circuit and wiring has been connected correctly and soundly. Valves on the gas and liquid line should be completely open.
- (3) All the scattered objects should be removed, especially metal filing, thrum and clip.

- (4) Check if the unit appearance and piping system has been damaged during transportation or handling.
- (5) Check if the terminals are loose and the phases are correct.

5.2.2 Trial Run

- (1) Trial run can be operated by professional personnel only after above items have been checked (items to be checked as per actual condition).
- (2) Power on the unit and press ON/OFF button to activate.
- (3) After compressor starting up, please immediately stop the unit when abnormal sound emits.
- (4) Trial run under several modes and check if the unit operates normally.

6 Common Malfunction and Elimination

If the unit doesn't run normally, please check the following items before ask for service.

Phenomenon	Reason	Treatment
The unit can not be activated.	The unit doesn't connect with power supply.	Connect with power supply.
	Low voltage.	Check if circuit voltage is within rated scope.
	Fuse broken or breaker trips off.	Replace fuse or connect breaker.
The unit operates but stops immediately.	Air inlet/outlet of indoor unit is blocked.	Remove obstacles.
Abnormal cooling or heating.	Air inlet/outlet of indoor unit is blocked.	Remove obstacles.
	Inappropriate temperature setting.	Adjust setting at thermostat.
	Doors or windows are opened.	Close the door or windows.
	Direct sunshine.	Draw curtain or louver.
	Too much heat source in the room.	Reduce heat source.
	Filter screen is blocked by dirt.	Clean the filter.

NOTE: If reasons are still unclear after checking above items, please contact Boreal service center and show phenomena and models.

Following circumstances are not malfunction.

"Malfunction"		Reason
Unit doesn't run.	When unit is started immediately after it is just turned off.	Overload protection switch makes it run after 3 minutes delay.
	When power is turned on.	Standby operating for about 1 minute.
Mist comes from the unit.	Under cooling.	Indoor high humidity air is cooled rapidly.
The unit emits noise.	Slight cracking sound is heard when just turned on.	It is noise when electronic expansion valve initialization.
	There is consecutive sound when cooling.	That's sound for gas refrigerant flowing in the unit.
	There is sound when unit starts or stops.	That's sound for gas refrigerant stops flowing.
	There is slight and consecutive sound when unit is running or after running.	That's sound for operation of drainage system.
The unit blows out dust.	When unit runs after no operation for a long period.	Dust in indoor unit is blew out.
The unit emits odor.	Operating.	The room odor absorbed by the unit is blew out again.
Indoor unit still runs after switch off.	After every indoor unit receive "stop" signal, fan will keep running.	Indoor fan can be set as "ON" or "AUTO" mode. Under "ON" mode, indoor fan will keep running after switch off the unit.

There are LED indicators on the main board of the indoor unit, which are used to display the operating status and malfunction information of the unit.

LED indicator	Color	Function
Power Indicator	Red	Indoor unit main board is powered on, Power Indicator is on.
Running Indicator	Green	After detecting the indoor fan turn-on signal, the running indicator light is on, when detecting the indoor fan turning-off signal, the running indicator light is off. When detecting a system failure, the running indicator light flashes.

Different running indicator flashing light means different system failure.

malfunction	Running Indicator status	Remark
Indoor Jumper cap failure	Light out 3S then flash once	Flash means light on 0.5S then light out 0.5S
Indoor fan failure	Light out 3S then flash twice	
Indoor tube temperature sensor failure	Light out 3S then flash four times	
Indoor air outlet temperature sensor failure	Light out 3S then flash six times	

7 Maintenance and Care

Regular check, maintenance and care should be performed by professional personnel, which will prolong the unit life span.

7.1 Drain Pipe

Regularly check if the drain pipe is clogged in order to drain condensate smoothly.

7.2 Notice before Seasonal Use

- (1) Check if the inlet/outlet of the indoor unit is clogged.
- (2) Check if the ground wire is earthed reliably.
- (3) Check if the filter screen has been set soundly.
- (4) Check if the unit is installed firmly. If there is something abnormal, please contact the local appointed service center.

7.3 Maintenance after Seasonal Use

- (1) Cut off main power supply of the unit.
- (2) Clean filter screen of indoor units.

- (3) Clean the dust of sundries on the indoor units.
- (4) In the event of rusting, use the anti-rust paint to stop spreading of rust.

7.4 Parts Replacement

Purchase parts from local appointed service center or dealer if necessary. When user need to replace the mainboard, installer should put old mainboard jumper cap and the short-driven electrical resistance on the new mainboard. (If there is no short-driven electrical resistance put on the old motherboard, installer need not to replace short-driven electrical.)

8 After-Sales Service

In case the air-conditioning unit you bought has any quality problem or you have any inquiry, please contact the local after-sales service agency designated by factory.

Warranty should meet the following requirements:

- (1) First run of the unit should be operated by professional personnel from factory appointed service center.
- (2) Only factory manufactured accessories can be used on the machine.
- (3) All the instructions listed in this manual should be followed.
- (4) Warranty will be automatically invalid if fails to obey any item mentioned above.

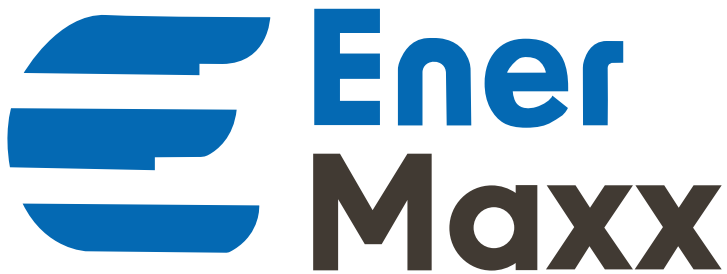
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OWNER'S MANUAL

Unitary Air Conditioner
INVERTER

Thank you for choosing our product.

For proper operation, please read and keep this manual carefully.

If you have lost the Owner's Manual, please contact the local agent or visit

www.borealintl.com or sent email to borealsales@borealintl.com for electronic version.

ENVBR24C

ENVBR36C

ENVBR48C

ENVBR60C

To Users

Thank you for selecting our product. Please read this instruction manual carefully before installing and using the product, so as to master and correctly use the product. In order to guide you to correctly install and use our product and achieve expected operating effect, we hereby instruct as below:

- (1) This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.
- (2) In order to ensure reliability of product, the product may consume some power under stand-by status for maintaining normal communication of system and preheating refrigerant and lubricant. If the product is not to be used for long, cut off the power supply; please energize and preheat the unit in advance before reusing it.
- (3) Please properly select the model according to actual using environment, otherwise it may impact the using convenience.
- (4) This product can't be installed at corrosive, inflammable or explosive environment or the place with special requirements, such as kitchen. Otherwise, it will affect the normal operation or shorten the service life of the unit, or even cause fire hazard or serious injury. As for above special places, please adopt special air conditioner with anti-corrosive or anti-explosion function.
- (5) If the product needs to be installed, moved or maintained, please contact our designated dealer or local service center for professional support. Users should not disassemble or maintain the unit by themselves, otherwise it may cause relative damage, and our company will bear no responsibilities.
- (6) All the illustrations and information in the instruction manual are only for reference. In order to make the product better, we will continuously conduct improvement and innovation. If there is adjustment in the product, please subject to actual product.

Exception Clauses

Manufacturer will bear no responsibilities when personal injury or property loss is caused by the following reasons:

- (1) Damage the product due to improper use or misuse of the product.
- (2) Alter, change, maintain or use the product with other equipment without abiding by the instruction manual of manufacturer.
- (3) After verification, the defect of product is directly caused by corrosive gas.
- (4) After verification, defects are due to improper operation during transportation of product.
- (5) Operate, repair, maintain the unit without abiding by instruction manual or related regulations.
- (6) After verification, the problem or dispute is caused by the quality specification or performance of parts and components that produced by other manufacturers.
- (7) The damage is caused by natural calamities, bad using environment or force majeure.

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1 Safety Precautions

WARNING

This product can't be installed at corrosive, inflammable or explosive environment or the place with special requirements, such as kitchen. Otherwise, it will affect the normal operation or shorten the service life of the unit, or even cause fire hazard or serious injury. As for above special places, please adopt special air conditioner with anti-corrosive or anti-explosion function.

Improper installation, adjustment, alteration, service, maintenance, or use can cause explosion, fire, electrical shock, or other conditions which may cause death, personal injury, or property damage. Consult a qualified installer, service agency, or your distributor or branch for information or assistance. The qualified installer or agency must use factory--authorized kits or accessories when modifying this product. Refer to the individual instructions packaged with the kits or accessories when installing. Follow all safety codes. Wear safety glasses, protective clothing, and work gloves. Use quenching cloth for brazing operations. Have fire extinguisher available. Read these instructions thoroughly and follow all warnings or cautions included in literature and attached to the unit. Consult local building codes and National Electrical Code (NEC) for special requirements. Recognize safety information. This is the safety--alert symbol .

When you see this symbol on the unit and in instructions or manuals, be alert to the potential for personal injury. Understand these signal words: **DANGER**, **WARNING**, **CAUTION** and **NOTICE**. These words are used with the safety--alert symbol.

 **DANGER** Indicates a hazardous situation that, if not avoided, will result in death or serious injury.

 **WARNING** Indicates a hazardous situation that, if not avoided, could result in death or serious injury.

 **CAUTION** Indicates a hazardous situation that, if not avoided, may result in minor or moderate injury.

NOTICE Indicates important but not hazard-related information, used to indicate risk of property damage.

⚠ WARNING**Electrical shock hazard:**

Failure to follow this warning could result in personal injury or death.

Before installing, modifying, or servicing system, main electrical disconnect switch must be in the OFF position. There may be more than 1 disconnect switch. Lock out and tag switch with a suitable warning label.

⚠ WARNING

Improper installation, adjustment, alteration, service or maintenance can cause personal injury, loss of life, or damage to property.

⚠ CAUTION

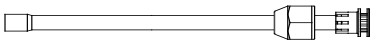
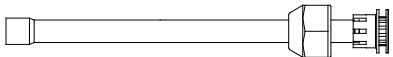
As with any mechanical equipment, contact with sharp sheet metal edges can result in personal injury. Take care while handling this equipment and wear gloves and protective clothing.

2 Product Introduction

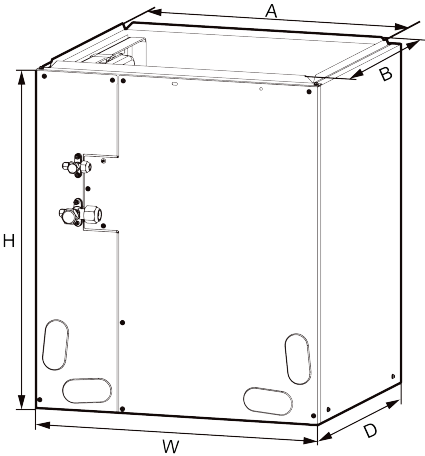
2.1 Product Description

The Boreal A-Coil offers the perfect combination of superior product quality, operating efficiency, operating sound levels and value for money. The evaporator unit uses the environmentally friendly refrigerant R410A, which is chlorine-free to help prevent damage to the ozone layer.

2.2 Optional Accessories

Indoor unit accessories				
No.	Name	Appearance	Q'ty	Usage
1	Throw-over pipe		1	Connect the unit with the liquid pipe
2	Throw-over pipe		1	Connect the unit with the gas pipe

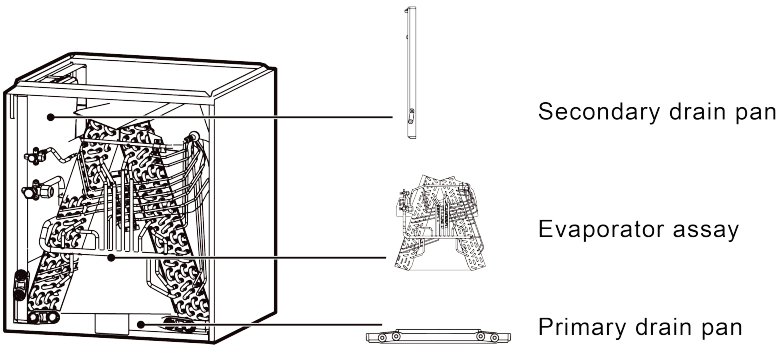
2.3 Physical Dimension



Unit: inch(mm)

Model	Dimension				
	W	D	H	A	B
ENVBR24C	17-1/2(445)	21-1/4(540)	23(584)	15-7/8(403)	19-3/8(492)
ENVBR36C	17-1/2(445)	21-1/4(540)	23(584)	15-7/8(403)	19-3/8(492)
ENVBR48C	24-1/2(622)	21-1/4(540)	28-1/2(724)	22-7/8(581)	19-3/8(492)
ENVBR60C	24-1/2(622)	21-1/4(540)	28-1/2(724)	22-7/8(581)	19-3/8(492)

2.4 Names of Main Parts



2.5 General Information

Cooling capacity range as shown below:

Model	Cooling capacity(ton)
ENVBR24C	2.0
ENVBR36C	3.0
ENVBR48C	4.0
ENVBR60C	5.0

3 General

The evaporator of indoor unit is charged with refrigerant in factory for pressure maintaining. The cut-off valve can be opened only when installation and vacuuming is done.

The drain pan must be at least 2" away from a standard gas-fired furnace heat exchanger and at least 4"-6" away from any drum-type or oil-fired furnace heat exchanger, depending on furnace model. Closer spacing may damage the drain pan and cause a leak.

Refer to the Product Specification for the proper use of these coils with specific furnaces, air handlers, condensers and line sets.

4 Installation

4.1 Pre-Installation Instruction

4.1.1 Checking Product Received

After receiving the product, please check if there is any damage caused by transportation. Shipping damage is the responsibility of the carrier. Verify the model number, specifications and accessories are correct prior to installation. The distributor or manufacturer will not accept claims from dealers for transportation damage or installation of incorrectly shipped units.

4.1.2 Before Installation

Carefully read all instructions for the installation prior to installing product. Make sure each step or procedure is understood and any special considerations are taken into account before starting installation. Assemble all tools, hardware and supplies needed to complete the installation. Some items may need to be purchased locally. Make sure everything needed to install the product is on hand before starting.

4.1.3 Codes & Regulations

This product is designed and manufactured to comply with national codes. It is installer's responsibilities to install the product in accordance with such codes and/or any prevailing local codes/regulations. The manufacturer assumes no responsibilities for equipment installed in violation of any codes or regulations.

These instructions are intended as a general guide and do not supersede local or national codes in any way. Authorities who have jurisdiction should be consulted before installation.

4.1.4 Replacement Parts

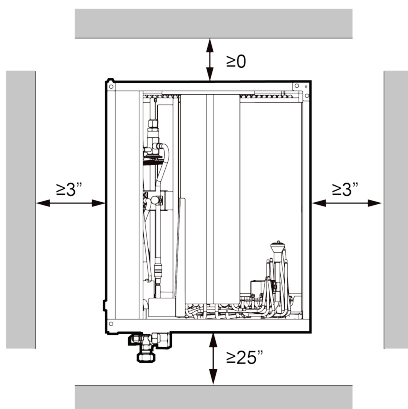
When reporting shortages or damages, or ordering repair parts, give the complete product model and serial numbers as stamped on the product. Replacement parts for this product are available through your contractor or local distributor.

4.2 Location

⚠ WARNING This coil is designed for indoor installation only. Do not install it outdoors.

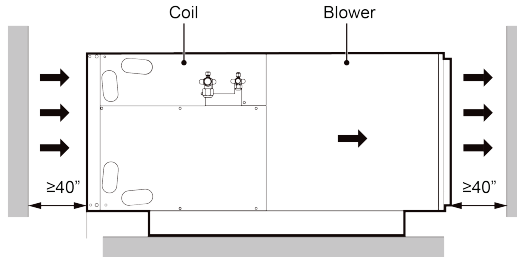
⚠ WARNING Not suitable for use with ammonia.

When installing the coil, take consideration to minimize the length of refrigerant tubing as much as possible. Do not install the air handler in a location either above or below the condenser that violates the instructions provided with the condenser. Service clearance is to take precedence. Allow a minimum of 25" in front of the unit for service clearance, as shown below.



When installing in an area directly over a finished ceiling (such as an attic), an emergency drain pan is required directly under the unit. See local and state codes for requirements. When installing this unit in an area that may become wet, elevate the unit with a sturdy, non-porous material. In installations that may lead to physical damage (i.e. a garage) it is advised to install a protective barrier to prevent such damage.

It is necessary to allow a minimum of 40" between the inlet/outlet of the indoor unit and wall, as shown below.



4.3 Piping Work

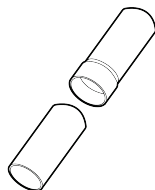
4.3.1 Specification of Connection Pipe

Model	External diameter (inch)	
	Gas pipe	Liquid pipe
ENVBR24C	Φ3/4	Φ3/8
ENVBR36C		
ENVBR48C		
ENVBR60C		

4.3.2 Piping Preparation

4.3.2.1 Solder Connection

All cut ends are to be round, burr free, and cleaned. Failure to follow this practice increases the chances for refrigerant leakage.

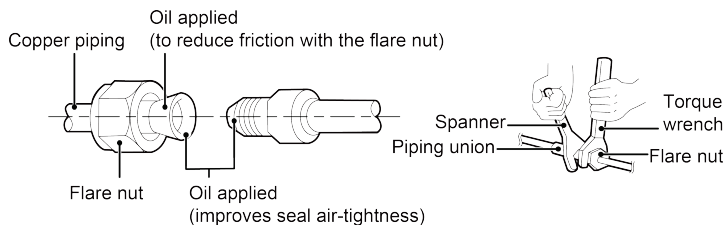


Line set size matches service valve connector



Do not crimp service valve connector when pipe is smaller than connector

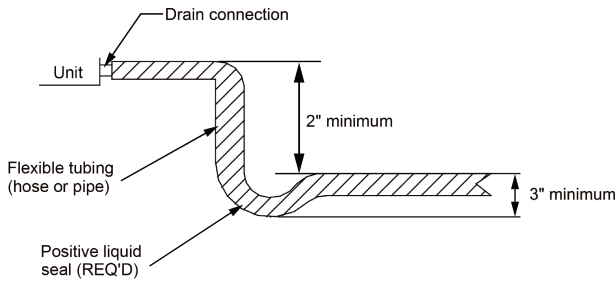
4.3.2.2 Screw Connection



Pipe diameter (inch)	Tightening torque (N·m)
Φ1/4	15-30
Φ3/8	35-40
Φ1/2	45-50
Φ5/8	60-65
Φ3/4	70-75
Φ7/8	80-85

4.4 Condensate Removal

- (1) It is not allowed to connect the condensate drain pipe into waste pipe or other pipelines which are likely to produce corrosive or peculiar smell to prevent the smell from entering indoors or corrupt the unit.
- (2) It is not allowed to connect the condensate drain pipe into rain pipe to prevent rain water from pouring in and cause property loss or personal injury.
- (3) Condensate drain pipe should be connected into special drain system for air conditioner.
- (4) The drain pan has primary and secondary drain connection. Condensate removal is performed by attaching a 3/4" PVC pipe to the evaporator coil pan and terminated in accordance with local or state Plumbing/HVAC codes. The installation must include a "P" style trap that is located closely to the evaporator coil. Do not over-tighten the drain connection in order to prevent possible damage to the evaporator drain pan. See the following figure for details of a typical condensate line "P" trap.



4.5 Ductwork

This coil is designed for a complete supply and return ductwork system.

⚠ WARNING

Do not operate the unit without all ductwork completed.

Do not operate this product without all ductwork attached.

Inadequate ductwork that restricts airflow can result in improper performance and compressor or heater failure. Ductwork is to be constructed in a manner that limits restrictions and maintains suitable air velocity. Ductwork is to be sealed to the unit in a manner that will prevent leakage.

Return ductwork: Do not terminate the return ductwork in an area that can introduce toxic or objectionable fumes/odors into the ductwork. The return ductwork is to be introduced into the coil.

Return Air Filters: Each installation must include a return air filter. This filtering may be performed at the coil or externally such as a return air filter grille.

4.6 Unit Installation

⚠ WARNING Risk of explosion or fire.

⚠ WARNING Can cause injury or death.

Install the furnace or blower and condensing unit according to the installation instructions provided with the unit.

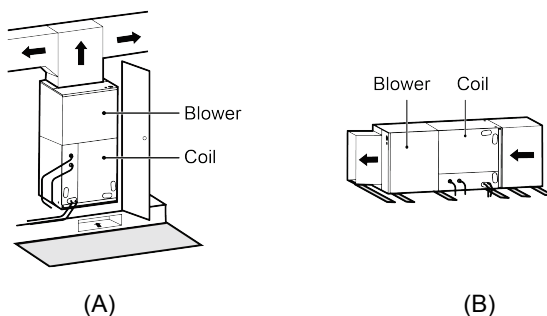
Position the cased coil on top of the furnace or blower cabinet and secure it using field-provided screws.

NOTE: If the coil is to be installed on an oil furnace, it may be necessary to install a field-installed transition between the furnace and the coil to prevent airflow restriction and possible damage to the coil drain pan. See the oil furnace installation instructions for details.

A stable connection is required between the coil and the blower to prevent dumping.

Based upon the actual conditions, if coil is installed as Fig (A), the coil should be concealed in a specific room or space and make sure the coil is not accessible to the general public.

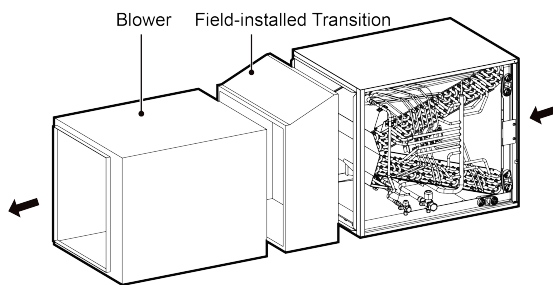
Based upon the actual conditions, if coil is installed as Fig (B), make sure that there is enough space for care and maintenance. And the coil is not accessible to the general public.



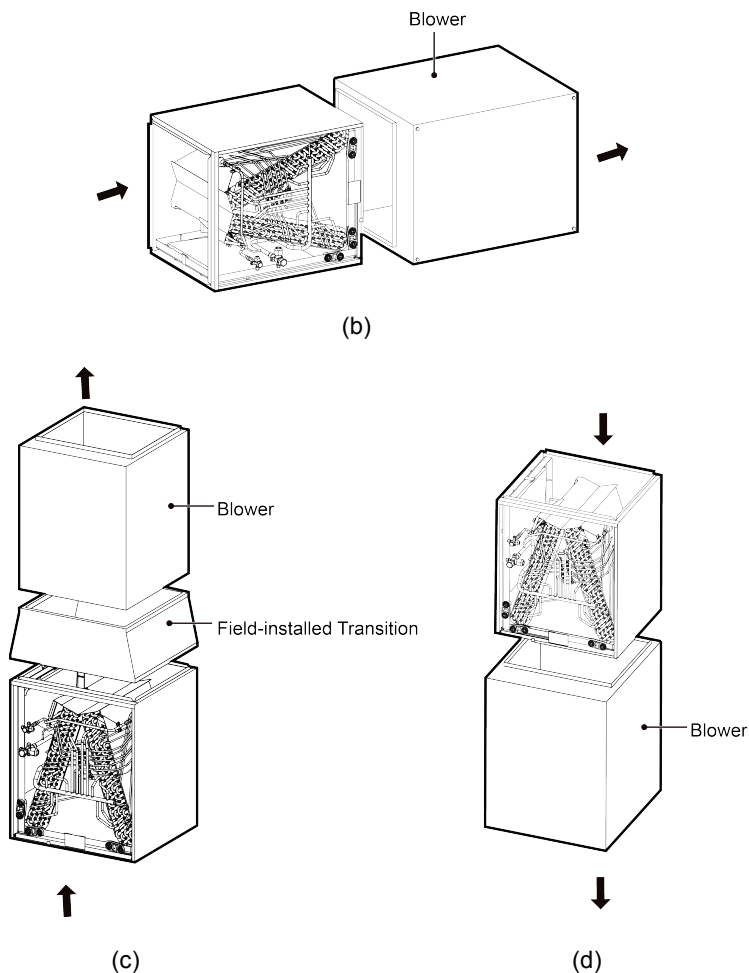
Based upon the actual conditions, Multi-Position A-Coils come factory installed with a vertical and horizontal drain pans and can be configured for upflow or horizontal pull-through installations.

When the coil matches blower, the side which is nearby from coil is NOT allowed to install electric heater kit. Recommended configuring is as shown below.

- (a) Standard Application: Left hand shown / Right hand similar (not shown)
- (b) Counter flow: Right hand shown / Left hand similar (not shown)
- (c) Upward flow
- (d) Downward flow

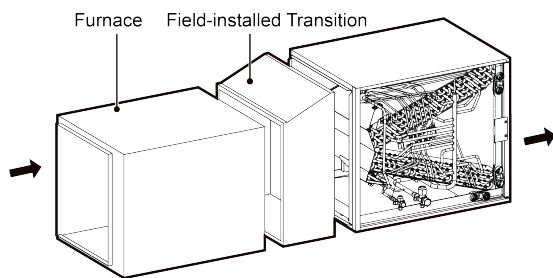


(a)

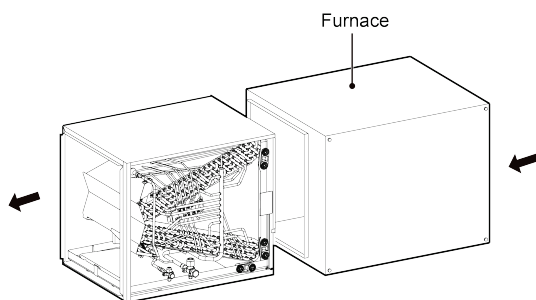


When the coil matches furnace, temperature of air flow which come from outlet of furnace must be required a maximum of 200°F . Recommended configuring is as shown below.

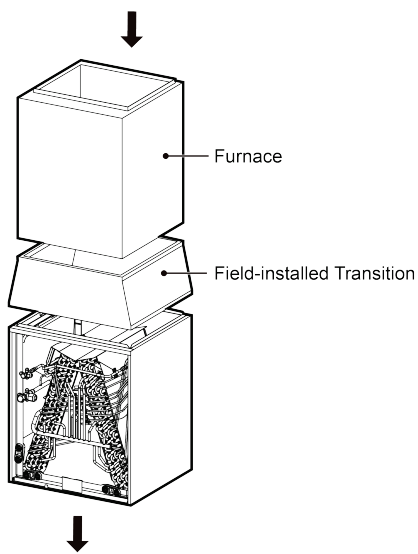
- (a) Standard Application: Right hand shown / Left hand similar (not shown)
- (b) Counter flow: Left hand shown / Right hand similar (not shown)
- (c) Downward flow
- (d) Upward flow



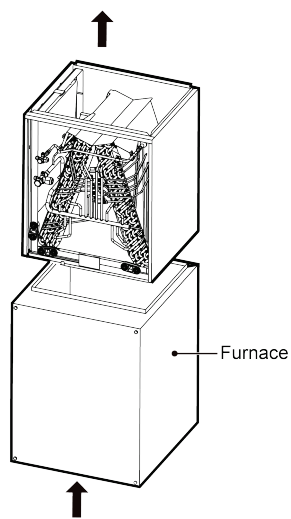
(a)



(b)



(c)



(d)

If the air inlet of furnace (or blower) is different with the air outlet of coil in size, it may be necessary to install a field-installed transition between the furnace (or blower) and the coil to proper airflow distribution (as shown in figure (a).)

Coil should be pitched slightly toward the drain connection. It is recommended to add silicone caulk between drain pans to prevent water seepage.

4.7 Sealing Ducts

⚠ WARNING There must be an airtight seal between the bottom of the furnace and the return air plenum. Use fiberglass sealing strips, caulking, or equivalent sealing method between the plenum and the air handler cabinet to ensure a tight seal. Return air must not be drawn from a room where the air handler or any gas-fueled appliance (i.e., water heater), or carbon monoxide-producing device (i.e., wood fireplace) is installed.

Ensure that the duct is secured and all joints are properly sealed to the coil cabinet flanges.

All indoor cabinets **MUST** be taped after installation to seal against any air leaks. System performance and efficiency will be reduced if air leakage exists.

There must be sealed with sponge or other thermal insulation material where around the cut-off valves to prevent air leakage or water seepage.

It is necessary to paste sponge seal around the air outlet to prevent leakage.

4.8 Leak Testing, Vacuuming and Charging

Refer to the outdoor unit instruction for leak testing, vacuuming and charging. Always leak check entire system before charging.

When vacuuming, you need to vacuum the liquid and gas pipe at the same time, and do not open the cut-off valve of coil until vacuum finished.

5 Blower Speed Selection

Proper air volume must be provided over the evaporator coil. Select a blower motor speed tap that will provide 300-450 CFM per 12,000 Btu/h of cooling capacity (wet coil). Recommended air flow volume as shown in Table 1.

Table 1

Cabinet		Recommended Vol(CFM)
Model	Width(in.)	
ENVBR24C	17.5	800
ENVBR36C	17.5	1000
ENVBR48C	24.5	1230
ENVBR60C	24.5	1510

6 Maintenance and Care

Regular check, maintenance and care should be performed by professional personnel, which will prolong the unit life span.

6.1 Drain Pipe

Regularly check if the drain pipe is clogged in order to drain condensate smoothly.

6.2 Notice before Seasonal Use

- (1) Check if the inlet/outlet of the indoor unit is clogged.
- (2) Check if the filter screen has been set soundly.
- (3) Check if the unit is installed firmly. If there is something abnormal, please contact the local appointed service center.

6.3 Maintenance after Seasonal Use

- (1) Clean the dust of sundries on the indoor units.
- (2) In the event of rusting, use the anti-rust paint to stop spreading of rust.

6.4 Parts Replacement

Purchase parts from local appointed service center or dealer if necessary.

7 After-Sales Service

In case the air-conditioning unit you bought has any quality problem or you have any inquiry, please contact the local after-sales service agency designated by factory.

Warranty should meet the following requirements:

- (1) First run of the unit should be operated by professional personnel from factory appointed service center.
- (2) Only factory manufactured accessories can be used on the machine.
- (3) All the instructions listed in this manual should be followed.
- (4) Warranty will be automatically invalid if fails to obey any item mentioned above.

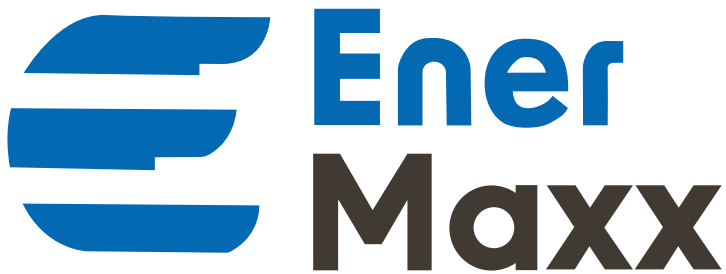
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10300 NW 19th Street Suite 105 Doral, FL 33172, 786-621-8250



66139902785



OWNER'S MANUAL

Unitary Air Conditioner
INVERTER

Thank you for choosing our product.

For proper operation, please read and keep this manual carefully.

If you have lost the Owner's Manual, please contact the local agent or visit

www.borealintl.com or sent email to borealsales@borealintl.com for electronic version.

ENVBR36COJ10A

ENVBR60COJ10A

To Users

Thank you for selecting our's product. Please read this instruction manual carefully before installing and using the product, so as to master and correctly use the product. In order to guide you to correctly install and use our product and achieve expected operating effect, we hereby instruct as below:

- (1) This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.
- (2) In order to ensure reliability of product, the product may consume some power under stand-by status for maintaining normal communication of system and preheating refrigerant and lubricant. If the product is not to be used for long, cut off the power supply; please energize and preheat the unit in advance before reusing it.
- (3) Please properly select the model according to actual using environment; otherwise it may impact the using convenience.
- (4) This product has gone through strict inspection and operational test before leaving the factory. In order to avoid damage due to improper disassembly and inspection, which may impact the normal operation of unit, please do not disassemble the unit by yourself. You can contact with the special maintenance center of our company if necessary.
- (5) When the product is faulted and cannot be operated, please contact with our maintenance center as soon as possible by providing the following information.
 - 1) Contents of nameplate of product (model, cooling/heating capacity, product No, ex-factory date).
 - 2) Malfunction status (specify the situations before and after the error occurs).
- (6) All the illustrations and information in the instruction manual are only for reference. In order to make the product better, we will continuously conduct improvement and innovation. We have the right to make necessary revision to the product from time to time due to the reason of sales or production, and reserve the right to revise the contents without further notice.

- (7) If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.
- (8) Boreal assumes no responsibility for personal injury, property loss or equipment damage caused by improper installation and commissioning, unnecessary maintenance, or not following relevant national rules and regulations, industrial standards and requirements in this instruction manual.
- (9) The final right to interpret for this instruction manual belongs to Boreal .

Exception Clauses

Manufacturer will bear no responsibilities when personal injury or property loss is caused by the following reasons:

- (1) Damage the product due to improper use or misuse of the product.
- (2) Alter, change, maintain or use the product with other equipment without abiding by the instruction manual of manufacturer.
- (3) After verification, the defect of product is directly caused by corrosive gas.
- (4) After verification, defects are due to improper operation during transportation of product.
- (5) Operate, repair, maintain the unit without abiding by instruction manual or related regulations.
- (6) After verification, the problem or dispute is caused by the quality specification or performance of parts and components that produced by other manufacturers.
- (7) The damage is caused by natural calamities, bad using environment or force majeure.

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1 Safety Precautions

WARNING

This product can't be installed at corrosive, inflammable or explosive environment or the place with special requirements, such as kitchen. Otherwise, it will affect the normal operation or shorten the service life of the unit, or even cause fire hazard or serious injury. As for above special places, please adopt special air conditioner with anti-corrosive or anti-explosion function.

Improper installation, adjustment, alteration, service, maintenance, or use can cause explosion, fire, electrical shock, or other conditions which may cause death, personal injury, or property damage. Consult a qualified installer, service agency, or your distributor or branch for information or assistance. The qualified installer or agency must use factory--authorized kits or accessories when modifying this product. Refer to the individual instructions packaged with the kits or accessories when installing. Follow all safety codes. Wear safety glasses, protective clothing, and work gloves. Use quenching cloth for brazing operations. Have fire extinguisher available. Read these instructions thoroughly and follow all warnings or cautions included in literature and attached to the unit. Consult local building codes and National Electrical Code (NEC) for special requirements. Recognize safety information. This is the safety--alert symbol .

When you see this symbol on the unit and in instructions or manuals, be alert to the potential for personal injury. Understand these signal words: **DANGER**, **WARNING**, **CAUTION** and **NOTICE**. These words are used with the safety--alert symbol.

 **DANGER** Indicates a hazardous situation that, if not avoided, will result in death or serious injury.

 **WARNING** Indicates a hazardous situation that, if not avoided, could result in death or serious injury.

 **CAUTION** Indicates a hazardous situation that, if not avoided, may result in minor or moderate injury.

NOTICE Indicates important but not hazard-related information, used to indicate risk of property damage.

⚠ WARNING**Electrical shock hazard:**

Failure to follow this warning could result in personal injury or death.

Before installing, modifying, or servicing system, main electrical disconnect switch must be in the OFF position. There may be more than 1 disconnect switch. Lock out and tag switch with a suitable warning label.

⚠ WARNING

- (1) The air conditioner should be grounded to avoid electric shock. Do not connect the ground wire to gas pipe, water pipe, lightning arrester or telephone wire.
- (2) The appliance shall be stored in a well-ventilated area where the room size corresponds to the room area as specified for operation.
- (3) The appliance shall be stored in a room without continuously operating open flames (for example an operating gas appliance) and ignition sources (for example an operating electric heater).
- (4) According to federal/state/local laws and regulations, all packages and transportation materials, including nails, metal or wooden parts, and plastic packing material, must be treated in a safe way.

⚠ WARNING

- (1) Please install according to this instruction manual. Installation must be performed in accordance with the requirement of NEC and CEC by authorized personnel only.
- (2) Any person who is involved with working on or breaking into a refrigerant circuit should hold a current valid certificate from an industry-accredited assessment authority, which authorises their competence to handle refrigerants safely in accordance with an industry recognised assessment specification.
- (3) Servicing shall only be performed as recommended by the equipment manufacturer.
- (4) The appliance shall be installed in accordance with national wiring regulations.
- (5) The fixed wires connecting to the appliance must be configured with all-pole disconnection device under voltage grade III according to wiring rules.
- (6) Air conditioner should be stored with protective measures against mechanical damage caused by accident.
- (7) If the installation space for air conditioner pipe is too small, adopt a protective measure to prevent the pipe from physical damage.

WARNING

- (8) During installation, use the specialized accessories and components, otherwise water leakage, electric shock or fire hazard may occur.
- (9) Please install the air conditioner in a secure place that can withstand the weight of air conditioner. Insecure installation may cause the air conditioner falling down and lead to injury.
- (10) Be sure to adopt independent power circuit. If the power cord is damaged, it must be repaired by the manufacturer, service agent or other professional agents.
- (11) The air conditioner can be cleaned only after it is turned off and power-disconnected, otherwise electric shock may occur.
- (12) The air conditioner is not intended to be cleaned or maintained by children without supervision.
- (13) Do not alter the setting of pressure sensor or other protective devices. If the protective devices are short-circuited or changed against rules, fire hazard or even explosion may occur.
- (14) Do not operate the air conditioner with wet hands. Do not wash or sprinkle water on the air conditioner, otherwise malfunction or electric shock will occur.
- (15) Do not dry the filter with naked flame or an air blower; otherwise the filter will be out of shape.
- (16) If the unit is to be installed in a small space, please adopt protective measures to prevent the concentration of refrigerant from exceeding the allowable safety limit; excessive refrigerant leakage may lead to explosion.
- (17) When installing or re-installing the air conditioner, please keep the refrigerant circuit away from substances other than the specified refrigerant, such as air. Any presence of foreign substances will cause abnormal pressure change or even explosion, resulting in injury.

NOTICE

- (1) Do not put a finger or other objects into the air inlet or return air grill.
- (2) Please adopt safety protection measures before touching the refrigerant pipe; otherwise your hands may be hurt.
- (3) Please arrange the drain pipe according to the instruction manual.
- (4) Never stop the air conditioner by directly cutting off the power.
- (5) Please select the proper copper pipe according to the requirement for pipe thickness.

NOTICE

- (6) Never install the air conditioner in the following places:
- a) Places with oil smoke or volatile liquid: plastic parts may deteriorate and fall off or even cause water leakage.
 - b) Places with corrosive gas: copper pipe or the welding parts may be corroded and cause refrigerant leakage.
- (7) Adopt proper measures to protect the outdoor unit from small animals because they may damage the electric components and cause malfunction of the air conditioner.

NOTICE

- (1) If thermostat is to be used, it should be connected first before powering up the unit, otherwise the thermostat may not be able to use.
- (2) Only use soft dry cloth or slightly wet cloth with neutral detergent to clean the casing of the air conditioner.
- (3) Before operating the unit under low temperature, connect it to power for 8 hours. If it is stopped for a short time, for example, one night, do not cut off the power (This is to protect the compressor).

2 Product Introduction

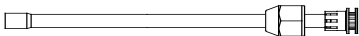
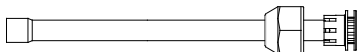
2.1 Operating Range

—	Cooling
Outdoor temperature	39.2°F(4°C)~118.4°F (48°C)

2.2 Standard Accessories

Outdoor unit accessories				
No.	Name	Appearance	Q'ty	Usage
1	Drain plug		3	To plug the unused drain hole

2.3 Optional Accessories

Outdoor unit accessories				
No.	Name	Appearance	Q'ty	Usage
1	Throw-over pipe		1	Connect the unit with the liquid pipe
2	Throw-over pipe		1	Connect the unit with the gas pipe

3 Installation

3.1 Installation Preparation

3.1.1 Selection of Installation Location

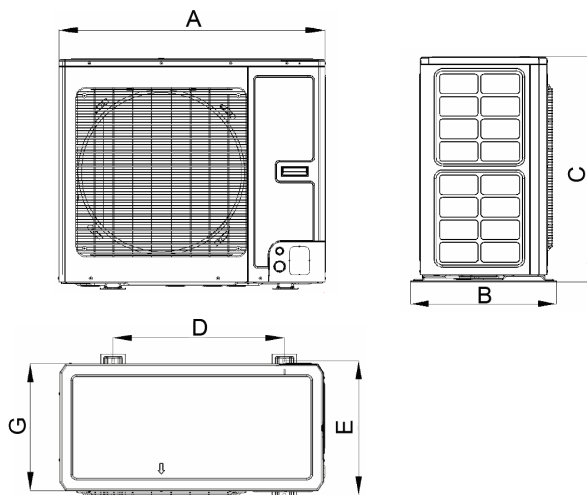
⚠ WARNING	
①.	The unit must be installed where strong enough to withstand the weight of the unit and fixed securely, otherwise the unit would topple or fall off.
②.	Install the air conditioner at a place where the inclination is less than 5° .
③.	Do not install where there is the danger of combustible gas leakage.
④.	Do not install the unit at a place with leakage of inflammable gas.

Selection of installation location for outdoor unit (Select a location pursuant to the following condition).

- (1) Noise and air flow produced by the outdoor unit will not disturb the neighbors.
- (2) Select a location that is safe and away from animals and plants. If not, please add safety fences to protect the unit.
- (3) Install at a place with good ventilation. Make sure the outdoor unit stays at a well-ventilated place with no obstacles nearby that may obstruct the air inlet and outlet.
- (4) The installation location should be able to withstand the weight and vibration of outdoor unit and allow the installation to be carried out safely.
- (5) Avoid installing at a place with leakage of inflammable gas, oil smoke or corrosive gas.
- (6) Keep it away from strong wind because strong wind will affect the outdoor fan and lead to insufficient air flow volume and thus affecting the unit's performance.
- (7) Away from any object that may get the air conditioner generating noise.
- (8) Install the outdoor unit at a place where condensate can be easily drained.

3.1.2 Unit Dimension

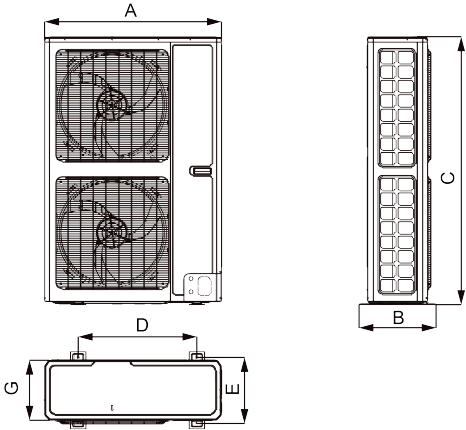
ENVBR36COJ10A



Unit: inch(mm)

Dimensions Model	A	B	C	D	E	G
ENVBR36COJ1OA	37 (940)	20-7/8 (530)	32-1/4 (820)	24 (610)	19-1/8 (486)	18-1/8 (460)

ENVBR60COJ1OA



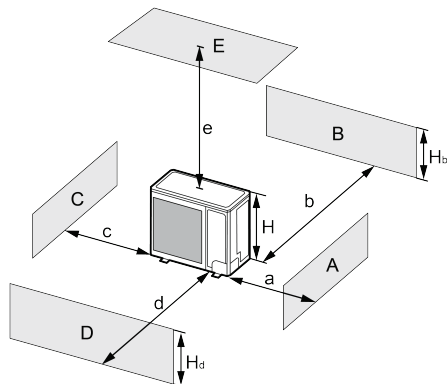
Unit: inch(mm)

Dimensions Model	A	B	C	D	E	G
ENVBR60COJ1OA	37 (940)	16-1/8 (410)	56-3/8 (1430)	24-7/8 (632)	13-7/8 (353)	12-5/8 (320)

3.1.3 Diagram of Unit Installation Space and Location

Diagram of installation space and location for outdoor unit (Notice: for best performance of the outdoor unit, make sure its installation space conforms to the following installation dimensions).

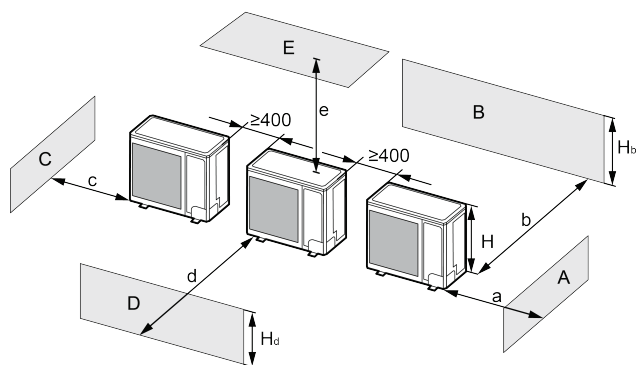
1) When one outdoor unit is to be installed.



A~E	H _b H _d H		(mm)				
			a	b	c	d	e
B	—		-	≥100	-	-	-
A,B,C,	—		≥300	≥100	≥100	-	-
B,E	—		-	≥100	-	-	≥1000
A,B,C,E	—		≥300	≥150	≥150	-	≥1000
D	—		-	-	-	≥1000	-
D,E	—		-	-	-	≥1000	≥1000
B,D	H _b < H _d	H _d > H	-	≥100	-	≥1000	-
	H _b > H _d	H _d < H	-	≥100	-	≥1000	-
B,D,E	H _b < H _d	H _b ≤1/2H	-	≥250	-	≥2000	≥1000
		1/2H < H _b ≤H	-	≥250	-	≥2000	≥1000
		H _b > H	Prohibited				
	H _b > H _d	H _d ≤1/2H	-	≥100	-	≥2000	≥1000
		1/2H < H _d ≤H	-	≥200	-	≥2000	≥1000
		H _d > H	Prohibited				

2) When two or more outdoor units are to be installed side by side.

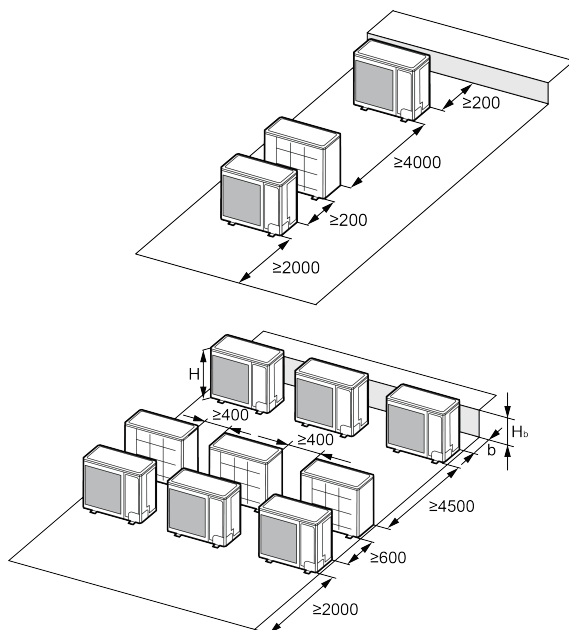
Unit: mm



A~E	H_b H_d H		(mm)				
			a	b	c	d	e
A,B,C	—		≥ 300	≥ 300	≥ 1000	-	-
A,B,C,E	—		≥ 300	≥ 300	≥ 1000	-	≥ 1000
D	—		-	-	-	≥ 2000	-
D,E	—		-	-	-	≥ 2000	≥ 1000
B,D	$H_b < H_d$	$H_d > H$	-	≥ 300	-	≥ 2000	-
	$H_b > H_d$	$H_d \leq 1/2H$	-	≥ 250	-	≥ 2000	-
		$1/2H < H_d \leq H$	-	≥ 300	-	≥ 2500	-
B,D,E	$H_b < H_d$	$H_b \leq 1/2H$	-	≥ 300	-	≥ 2000	≥ 1000
		$1/2H < H_b \leq H$	-	≥ 300	-	≥ 2500	≥ 1000
		$H_b > H$	Prohibited				
	$H_b > H_d$	$H_d \leq 1/2H$	-	≥ 250	-	≥ 2500	≥ 1000
		$1/2H < H_d \leq H$	-	≥ 300	-	≥ 2500	≥ 1000
		$H_d > H$	Prohibited				

3) When outdoor units are installed in rows.

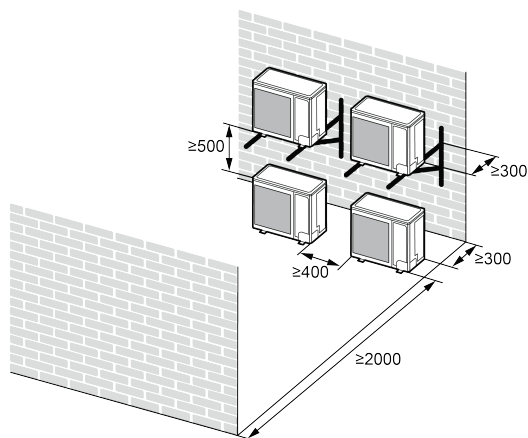
Unit: mm



H_b H	(mm)
$H_b \leq 1/2H$	$b \geq 250$
$1/2H < H_b \leq H$	$b \geq 300$
$H_b > H$	Prohibited

4) When outdoor units are installed one above another.

Unit: mm



3.2 Unit Installation

NOTICE

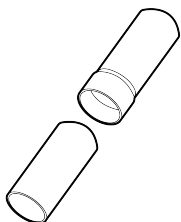
The outdoor unit does not have a TXV (thermal expansion valve), please make sure there is a throttling valve in the indoor unit (air handler or A coil).

3.2.1 Outdoor Unit Installation

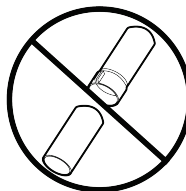
- (1) If the outdoor unit is installed on a solid ground such as concrete, use M10 screw bolts and nuts to secure the unit and make sure the unit stands erect and level.
- (2) If it vibrates and causes noise, please add rubber cushion between the outdoor unit and the installation base.
- (3) Plugs and drainage connector are not recommended if there is an electrical heater on the chassis.

3.2.2 Connection Pipe Installation

3.2.2.1 Installation Notice and Requirement on Connection Pipe



Line set size matches service valve connector



Do not crimp service valve connector when pipe is smaller than connector

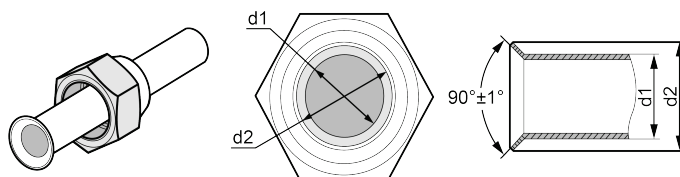
Installation method: Connect the connection pipes first to the unit. When bending a connection pipe, be careful not to damage the pipe. Do not over-tighten the screw nut, otherwise leakage will occur. Besides, the outside of connection pipe should be added with a layer of insulating cotton to protect it from mechanical damage during installation, maintenance and transportation.

Model \ Item	Size of fitting pipe(inch)		Maximum pipe length feet(m)	Biggest drop between indoor and outdoor units feet(m)
	Liquid pipe	Gas pipe		
ENVBR36COJ1OA ENVBR60COJ1OA	Φ3/8	Φ3/4	98.4(30)	49.2(15)

Connection pipe should adopt water-proof insulating material. Its wall thickness should be 0.5-1.0mm and the pipe wall should be able to withstand 6.0MPa. The longer the connection pipe is the worse cooling performance it has.

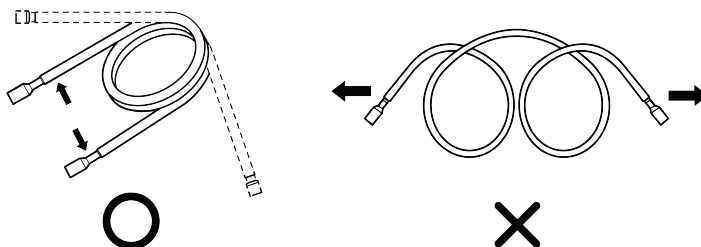
3.2.2.2 Pipe Flaring

- (1) Cut the connection pipe with a pipe cutter.
- (2) The mouth of connection pipe should face downward. Remove burrs with the cut surface so that the chips do not enter the pipe.
- (3) Remove the cut-off valve of outdoor unit and take out the flare nut from the bag of indoor unit accessories. Then fit the flare nut on the pipe and use a flaring tool to flare the mouth of connection pipe.
- (4) Check whether the flaring part has cracked. (See the figure below).

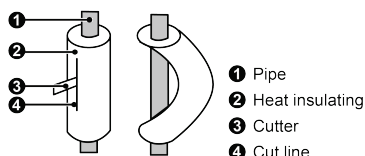


3.2.2.3 Pipe Bending

- (1) The pipes are shaped by your hands. Be careful not to collapse them.



- (2) Do not bend the pipes in an angle more than 90° .
- (3) If the pipe is repeatedly bent or extended, it will become hard and difficult to be bent or extended. So do not bend or extend the pipe for more than 3 times.
- (4) When bending the pipe, do not bend it excessively, otherwise it will get broken. As shown beside, use a sharp cutter to cut the heat insulating pipe and bend it after the pipe is exposed. After bending, place the heat insulating pipe back on the pipeline and fix it with adhesive tape.



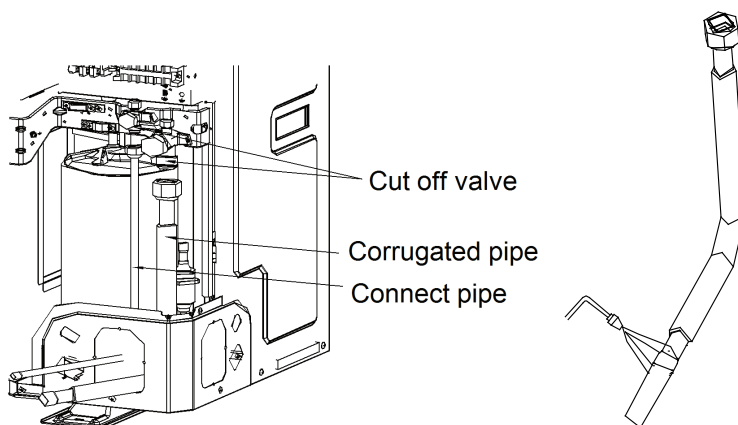
3.2.2.4 Connection Pipe of the Units

NOTICE	
①.	Connect the pipe to the unit. Please follow the instructions stated in the figures below. Use both spanner and torque wrench.
②.	When connecting the tapered screw nut, first apply chilled machine oil on its inner and outer surface and then screw it up for 3~4 circles.
③.	Confirm the tightening torque by referring to the following table (If the screw nut is over-twisted, it may be damaged and cause leakage).

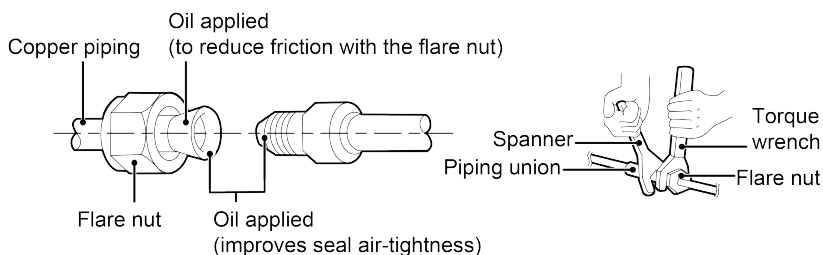
- ④. Check whether gas leakage occurs to the connection pipe and then apply thermal insulation, as shown below.
- ⑤. Wind sponge around the joint of gas pipe and heat insulation sheath of gas collecting pipe.
- ⑥. Be sure to connect gas pipe after liquid pipe is connected.
- ⑦. Be sure to have insulation for gas pipe. Insulation for liquid pipe is optional.

3.2.2.4.1 Solder Connection

Screw on the flare nut of the flaring connecting pipe on the outdoor unit valve.



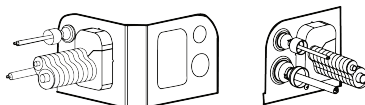
3.2.2.4.2 Screw Connection



Pipe diameter (inch)	Tightening torque (N·m)
Φ1/4	15-30
Φ3/8	35-40
Φ1/2	45-50
Φ5/8	60-65
Φ3/4	70-75
Φ7/8	80-85

3.2.2.5 Sealing of the Knock-off Hole

As for the built-in valve model, during the installation process for connection pipe, when the connection pipe is passing through the knock-off hole, conduct sealing with insulated cotton in the knock-off hole of outdoor unit to prevent small animals from entering. See the following figures.



3.2.3 Connection Pipe Vacuum Pumping and Leak Detection

3.2.3.1 Vacuum Pumping

NOTICE

- | | |
|---|--|
| ① | Make sure the outlet of vacuum pump is away from fire source and is well-ventilated. |
| ② | Before vacuum pumping, make sure the unit cut-off valves are closed. |
| ③ | When vacuum pumping, both the liquid pipe and the gas pipe must be pumped. |

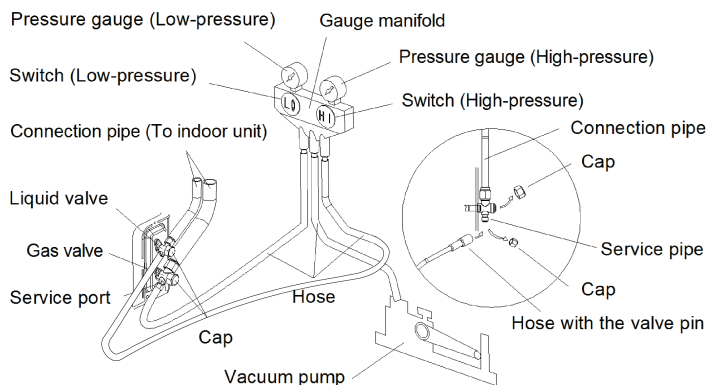
- (1) Remove the caps of the liquid valve, gas valve and also the service port.
- (2) Connect the hoses at the low pressure and high pressure sides of the manifold valve assembly to the service ports of the unit's gas valve and liquid valve, and meanwhile the gas and liquid valves should be kept closed in case of refrigerant leak.
- (3) Connect the hose used for evacuation to the vacuum pump.
- (4) Open the switch at the low pressure and high pressure side of the manifold valve at the same time, assembly and start the vacuum pump.
- (5) The evacuation duration depends on the unit's capacity, generally.

Model	Time(min)
ENVBR36COJ10A	30
ENVBR60COJ10A	45

And verify if the pressure gauge at the low pressure side of the manifold valve assembly reads -0.1MPa, if not, it indicates there is leak somewhere. Then, close the switch fully and then stop the vacuum pump.

- (6) Wait for 10min to see if the system pressure can remain unchanged. During this time, the reading of the pressure gauge at the low pressure side can not be larger than 0.005MPa.

- (7) Slightly open the liquid valve and let some refrigerant go to the connection pipe to balance the pressure inside and outside of the connection pipe, so that air will not come into the connection pipe when removing the hose. Note that the gas and liquid valve can be opened fully only after the manifold valve assembly is removed.
- (8) Place back the caps of the liquid valve, gas valve and also the service port.



NOTICE For large-size units, there are maintenance ports for liquid valve and gas valve. During evacuation, you may connect the two hoses of the branch valve assembly to the maintenance ports to speed up the evacuation.

3.2.4 Refrigerant Adding

See the following table for the amount of additional refrigerant.

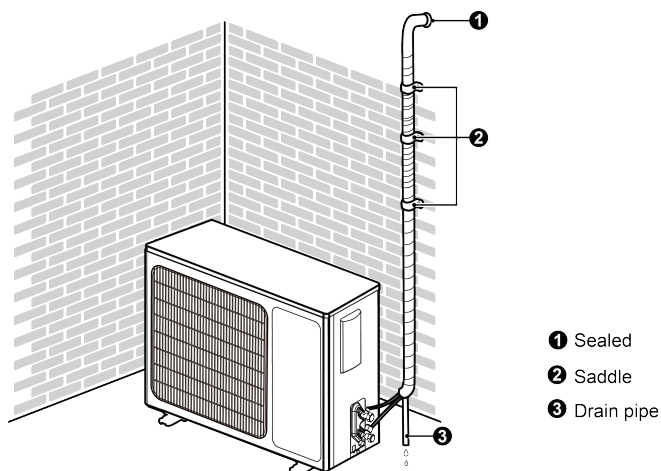
Model \ Item	Standard pipe length	Unnecessary charge pipe length	Additional refrigerant amount for extra pipe
ENVBR36COJ10A ENVBR60COJ10A	7.5m	≤9.5m	30g/m

3.2.5 Installation of Drain Pipe

3.2.5.1 Outdoor Side Drainage Pipe

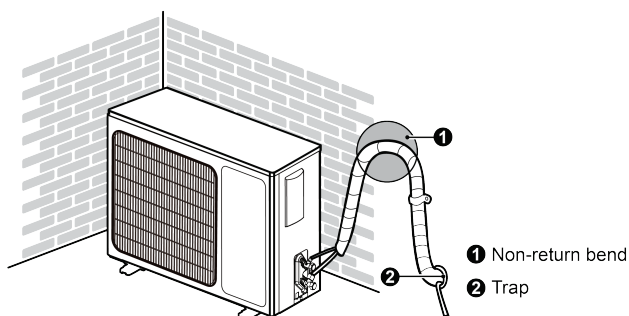
- (1) If the outdoor unit is underneath the indoor unit, arrange the pipeline according to the following diagram.
 - 1) Drain hose should be placed on the ground and its end should not be immersed into water. The whole pipeline should be supported and fixed onto the wall.

- 2) Wind the insulating tape from bottom to top.
- 3) The whole pipeline should be wound with insulating tape and fixed onto the wall with saddles.



- (2) If the outdoor unit is above the indoor unit, arrange the pipeline according to the following diagram.

- 1) Wind the insulating tape from bottom to top.
- 2) The whole pipeline should be wound together to avoid water returning to the room.
- 3) Use saddles to fix the whole pipeline onto the wall.



3.3 Electrical Installation

3.3.1 Requirement and Notice on Electrical Installation

WARNING

The electrical installation for the air conditioner should observe the following requirements:

- ①. The electrical installation must be conducted by professionals in compliance with local laws and regulations and the instructions in this manual. Never extend the power cords. The electric circuit must be equipped with a circuit breaker and air switch both with sufficient capacity.
- ②. The unit's operating power must be within the nominal range stated in the instruction manual. Use a specialized power circuit for the air conditioner. Do not draw power from another power circuit.
- ③. The air conditioner circuit should be at least 1.5m away from any inflammable surface.
- ④. The external power cords, the thermostat wires and outdoor unit must be effectively fixed.
- ⑤. The external power cords, the thermostat wires and outdoor unit can't directly contact any hot objects. For example: they must not contact chimney pipes, warm gas pipes or other hot objects.
- ⑥. The external power cords, and the thermostat wires and outdoor unit must not be squeezed. Never pull, stretch or bend the wires.
- ⑦. The external power cords, the thermostat wires and outdoor unit must not collide with any metal beam or edge on the ceiling, or touch any metal burrs or sharp metal edge around.
- ⑧. Connect wires correspondingly by referring to the circuit diagram labeled on the unit or electric box. Screws must be tightened up. Slipped screws must be replaced by specialized flat-head screws.
- ⑨. Wiring terminals should be connected firmly to the terminal board. Loose connection is forbidden.
- ⑩. The wire gauge of power cords should be large enough. Damaged power cords or other wires must be replaced by specialized wires. Wiring work must be done according to national wiring rules and regulations.

3.3.2 Electrical Parameters

Model	Power supply	Fuse capacity (A)	Maximum over-current protection (A)	Minimum circuit ampacity (A)
ENVBR36COJ10A	208/230V-1Ph-60Hz	35	35	24
ENVBR60COJ10A	208/230V-1Ph-60Hz	45	45	35

3.3.3 Connection of Power Cords and Thermostat Wires

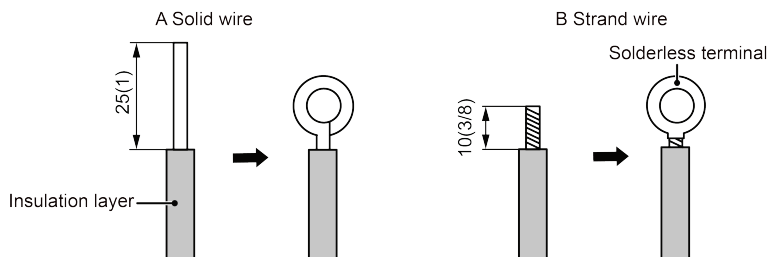
(1) For solid wires (as shown below):

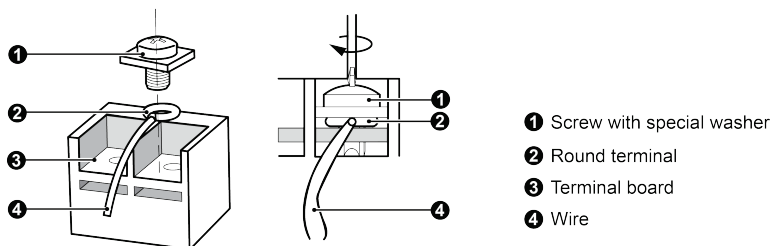
- 1) Use wire cutters to cut off the wire end and then peel away about 25mm of the insulation layer.
- 2) Use a screwdriver to unscrew the terminal screw on the terminal board.
- 3) Use nippers to bend the solid wire into a ring that fits the terminal screw.
- 4) Form a proper ring and then put it on the terminal board. Use a screwdriver to tighten up the terminal screw.

(2) For strand wires (as shown below):

- 1) Use wire cutters to cut off the wire end and then peel away about 10mm of the insulation layer.
- 2) Use a screwdriver to unscrew the terminal screw on the terminal board.
- 3) Use a round terminal fastener or clamp to fix the round terminal firmly on the peeled wire end.
- 4) Locate the round terminal conduit. Use a screwdriver to replace it and tighten up the terminal screw (as shown below).

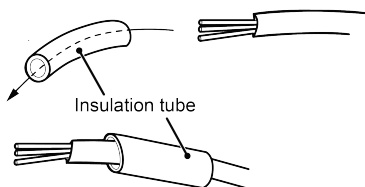
Unit: mm(inch)





(3) How to connect the thermostat wires and power cords.

Lead the thermostat wires and power cords through the insulation tube (as shown in the following figure).

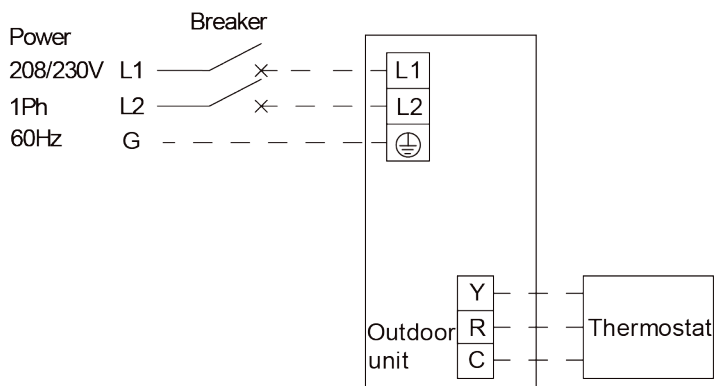


⚠ WARNING

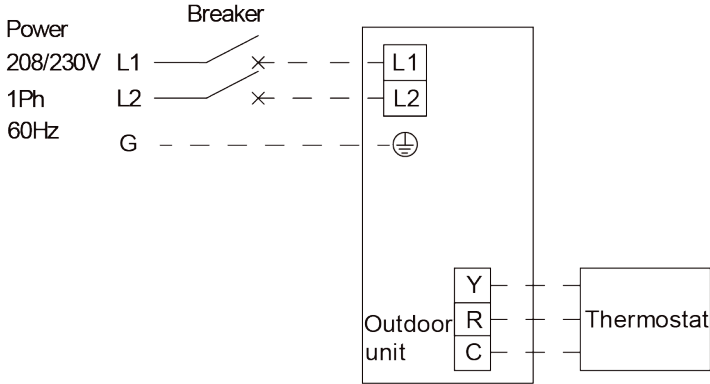
- ①. Before working, please check whether the units are powered on.
- ②. Wrong wire connection may burn the electrical components.
- ③. Connect the wires firmly to the wiring box. Incomplete installation may lead to fire hazard.
- ④. Ground wire should be connected.

Wires of outdoor units

Single-phase unit: ENVBR36COJ10A



Single-phase unit: ENVBR60COJ10A

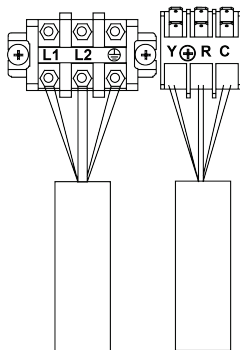
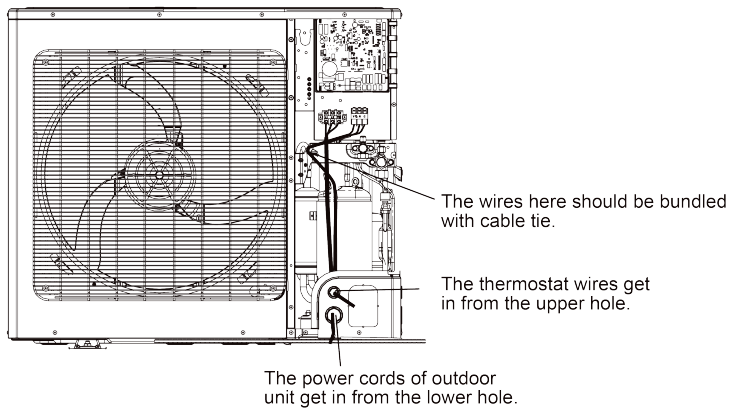


⚠ WARNING

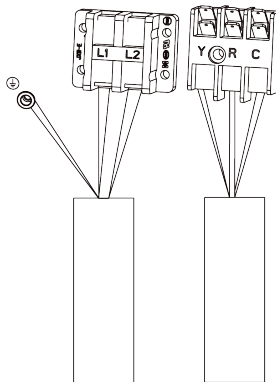
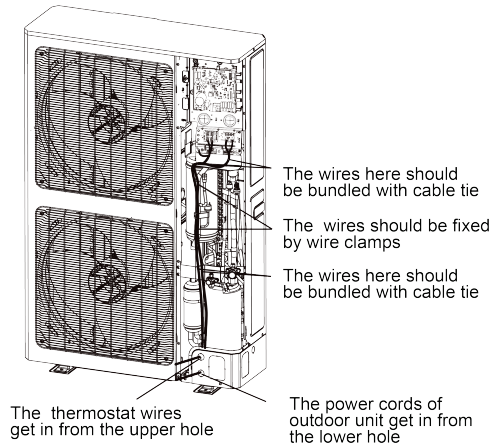
- ①. High and low voltage wires should be led through different rubber rings of the electric box cover.
- ②. Do not bundle up the thermostat wires or lay them side by side, otherwise errors will occur.
- ③. High and low voltage wires should be secured separately.
- ④. Use screws to tighten up the thermostat wires and power cords of the units on the terminal board. Wrong connection may lead to fire hazard.
- ⑤. If the thermostat wires of the units and power cords are not correctly connected, the air conditioner may get damaged.
- ⑥. Ground the units through connecting the ground wire.
- ⑦. The units should comply with applicable local and national rules and regulations on power consumption.
- ⑧. When connecting the power cords, make sure the phase sequence of the power supply matches with the corresponding terminals, otherwise the compressor will get reversed and operate abnormally.

Remove the big handle/front panel of the outdoor unit and insert one end of the thermostat cord and the power cord to the terminal board.

Single-phase: ENVBR36COJ10A



Single-phase: ENVBR60COJ10A



3.4 Check after Installation

Check Items after Installation

Check items	Possible events due to improper installation
Is the main body installed securely?	The unit may fall down, vibrate or produce noise.
Did you do water leakage test?	Cooling capacity may become unsatisfactory.
Is the unit well insulated from heat?	Condensate, water drops may occur.
Does water drainage go well?	Condensate, water drops may occur.

Check items	Possible events due to improper installation
Is the voltage consistent with that stated on the nameplate?	The unit may fail or its components may get burned.
Are the wires and pipes installed correctly?	The unit may fail or its components may get burned.
Has the unit been safely grounded?	Risk of electric leakage.
Do the specifications of wires comply with the requirement?	The unit may fail or its components may get burned.
Is there any obstacle blocking the air inlet and outlet of the units?	Cooling capacity may become unsatisfactory.
Have you recorded the length of refrigerant pipe and the refrigerant charging amount?	The refrigerant charging amount can't be controlled.

3.5 Test Running

Preparation before connecting the power:

- (1) Power must not be connected if the installation work is not completed.
- (2) Control circuit is correct and all the wires are firmly connected.
- (3) Cut-off valves of the gas pipe and liquid pipe are open.
- (4) The inside of the unit should be clean. Take irrelevant objects out if there is any.
- (5) After checking, re-install the front side plate.

Operation after connecting the power:

- (1) If all the above works are finished, power on the unit.
- (2) Make sure the units can run normally.

NOTICE

- ①. If you use thermostat to turn off the unit and then immediately turn the unit on again, compressor will need 3min to restart. Even if you press "ON/OFF" button on the thermostat, it won't be started up right away.
- ②. If there's no display on the thermostat, it's probably because the connection wires between the units and the thermostat are not connected. Please check again.

4 Maintenance

4.1 Failures Not Caused by Faults of the AC

If your air conditioner fails to function normally, please first check the following items before maintenance:

Problem	Cause	Corrective measure
The air conditioner can't run.	If you turn off the unit and then immediately turn it on, in order to protect the compressor and avoid system overload, compressor will delay running for 3min.	Please wait for a while.
	Wire connection is wrong.	Connect wires according to the wiring diagram.
	Fuse or circuit breaker is broken.	Replace the fuse or switch on the circuit breaker.
	Power failure.	Restart after power is resumed.
	Power plug is loose.	Re-insert the power plug.
Bad cooling effect.	Air inlet and outlet of the units have been blocked.	Clear the obstacles and keep the room for the units well ventilated.
	Improper temperature setting	Reset a proper temperature.
	Fan speed is too low.	Reset a proper fan speed.
	Air flow direction is not right.	Change the direction of air louvers.
	Doors or windows are open.	Close them.
	Exposed under direct sunshine.	Put on curtains or louvers in front of the windows.
	Too many heat sources in the room.	Remove unnecessary heat sources.
	Filter is blocked or dirty.	Send for a professional to clean the filter.
	Air inlets or outlets of the units are blocked.	Clear away obstacles that are blocking the air inlets and outlets of the units.

The following situations are not operation failures.

Problem	Time of occurrence	Cause
Mist comes from the air conditioner.	During operation.	If the unit is running under high humidity, the wet air in the room will be quickly cooled down.
The air conditioner generates some noise.	The air conditioner is buzzing at the beginning of operation.	Thermostat will be buzzing when it starts working. The noise will become weak 1min later.
Dust comes from the air conditioner.	When the unit is turned on, it purrs.	When the system is just started, the refrigerant is not stable. About 30s later, the purr of the unit becomes low.
	There is hissing sound when the unit is started or stopped and a slight hissing sound during and after operation.	It' s the sound of gaseous refrigerant that stops flowing and the sound of drainage system.
	There is a sound of crunching during and after operation.	Because of temperature change, front panel and other components may be swelled up and cause abrasion sound.
	The unit starts operation after being unused for a long time.	Dust inside the units come out together with the air.
The air conditioner generates some smell.	During operation.	The room smell or the smell of cigarette comes out through the units.

NOTICE

Check the above items and adopt the corresponding corrective measures. If the air conditioner continues to function poorly, please stop the air conditioner immediately and contact Boreal's authorized local service center. Ask our professional service staff to check and repair the unit.

4.2 Error Code

WARNING

- ①. If abnormal things (for example, awful smell) occur, please stop the unit immediately and disconnect power. Then contact Boreal' s authorized service center. If the unit continues to run in abnormal situations, it may get damaged and cause electric shock or fire hazard.
- ②. Do not repair the air conditioner by yourself. Improper maintenance will cause electric shock or fire hazard. Please contact Boreal' s authorized service center and send for professional service staff to repair.

If the LED displayer on mainboard of outdoor unit displays an error code, please refer to the error code meaning stated in the following table.

No.	Error code	Error
1	E1	Compressor high-pressure protection
2	E3	Compressor low-pressure protection
3	E4	Compressor air discharge high-temperature protection
4	F2	Condenser temperature sensor error
5	F3	Outdoor ambient temperature sensor error
6	F4	Discharge temperature sensor error
7	F6	ODU tube temperature sensor error
8	EE	ODU memory chip error
9	H4	Overload
10	H5	IPM protection
11	H6	DC fan error
12	H7	Driver out-of-step protection
13	HC	PFC protection
14	Lc	Startup failure
15	P0	Driver reset protection
16	P5	Over-current protection
17	P6	Master control and driver communication error
18	P7	Driver module sensor error
19	P8	Driver module high temperature protection
20	PA	AC current protection
21	Pc	Driver current error
22	PL	Bus low-voltage protection
23	PH	Bus high-voltage protection
24	PU	Charge loop error
25	ee	Drive memory chip error

No.	Error code	Error
26	e3	Low pressure sensor error
27	C4	ODU jumper cap error

4.3 Unit Maintenance

WARNING

- ①. Only professionals are allowed to carry on daily maintenance.
- ②. Before contacting any wire, make sure power is cut off.
- ③. Do not let any inflammable objects near the unit.
- ④. Do not use organic solvent to clean the air conditioner.
- ⑤. If you need to replace a component, please ask a professional to repair with a component supplied by the original manufacturer so as to ensure the unit's quality.
- ⑥. Improper operation may get the unit broken, hit by electric shock or cause fire.
- ⑦. Do not make the air conditioner wet or electric shock may be lead, ensure that the air conditioner will not be cleaned by water rinsing under any circumstance.

NOTICE

- ①. Before cleaning, please make sure the unit is stopped. Cut the circuit breaker and remove the power socket, otherwise, electric shock may occur.
- ②. Do not wash the air conditioner with water, otherwise fire hazard or electric shock may occur.
- ③. When cleaning the filter, please be careful of your steps. If you need to work high above the ground, please be extremely careful.

4.3.1 Heat Exchanger of Outdoor Unit

Conduct cleaning for the heat exchanger of outdoor unit periodically, clean it once at least in every two months. Clean the dust and sundries on the surface of the heat exchanger with dust collector and nylon brush, if there's compressed air source; use the compressed air to blow the dust on the surface of the heat exchanger. Don't use tap water for cleaning.

4.3.2 Drainage Pipe

Periodically check if the drainage pipe is blocked to smooth the condensate water.

4.3.3 Notices at the Beginning of the Using Season

- (1) Check if the air inlet/outlet of the units are blocked.
- (2) Check if the ground connection is reliable.

- (3) Check if the air filter screen is properly installed.
- (4) If starting up again after long-term shut down, preset the power switch of air conditioner to “ON” status before 8h of operation, to preheat the crankcase of outdoor compressor.
- (5) Check if the installation of outdoor unit is firm, if not, please contact with Boreal appointed maintenance center.

4.3.4 Maintenance at the End of the Using Season

- (1) Cut off the main power of air conditioner.
- (2) Clean the dust and sundries in outdoor unit.
- (3) If the outdoor unit is rusty, coat the rusty location with paint to prevent it from expanding.

4.3.5 Components Replacement

Components are available in Boreal agency or Boreal distributors nearby.

4.4 Notice on Maintenance

4.4.1 Information on Servicing

The manual shall contain specific information for service personnel who shall be instructed to undertake the following when servicing an appliance that employs a flammable refrigerant.

4.4.1.1 General Work Area

All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out. Work in confined spaces shall be avoided. The area around the workspace shall be sectioned off. Ensure that the conditions within the area have been made safe by control of flammable material.

4.4.1.2 Ventilated Area

Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

4.4.1.3 Checks to the Refrigeration Equipment

Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times the manufacturer's maintenance and service guidelines shall be followed. If in doubt consult the manufacturer's technical department for assistance.

The following checks shall be applied to installations using flammable refrigerants:

- (1) The ventilation machinery and outlets are operating adequately and are not obstructed.
- (2) If an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant.
- (3) Marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected.
- (4) Refrigeration pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

4.4.1.4 Checks to electrical devices

Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment so all parties are advised.

Initial safety checks shall include:

- (1) Those capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking.
- (2) That no live electrical components and wiring are exposed while charging, recovering or purging the system.
- (3) That there is continuity of earth bonding.

4.4.2 Repairs to Sealed Components

4.4.2.1 Electrical Safety

From the equipment being worked upon prior to any removal of sealed covers, etc. If it is absolutely necessary to have an electrical supply to equipment during servicing, then a permanently operating form of leak detection shall be located at the most critical point to warn of a potentially hazardous situation.

4.4.2.2 Particular Attention

Electrical components, the casing is not altered in such a way that the level of protection is affected. This shall include damage to cables, excessive number of connections, terminals not made to original specification, damage to seals, incorrect fitting of glands, etc.

Ensure that apparatus is mounted securely.

Ensure that seals or sealing materials have not degraded such that they no longer serve the purpose of preventing the ingress of flammable atmospheres. Replacement parts shall be in accordance with the manufacturer's specifications.

NOTICE

The use of silicon sealant may inhibit the effectiveness of some types of leak detection equipment. Intrinsically safe components do not have to be isolated prior to working on them.

4.4.3 Repair to Intrinsically Safe Components

Do not apply any permanent inductive or capacitance loads to the circuit without ensuring that this will not exceed the permissible voltage and current permitted for the equipment in use.

Intrinsically safe components are the only types that can be worked on while live in the presence of a flammable atmosphere. The test apparatus shall be at the correct rating.

Replace components only with parts specified by the manufacturer. Other parts may result in the ignition of refrigerant in the atmosphere from a leak.

4.4.4 Cabling

Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. The check shall also

take into account the effects of ageing or continual vibration from sources such as compressors or fans.

4.4.5 Charging Procedures

In addition to conventional charging procedures, the following requirements shall be followed.

- (1) Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimize the amount of refrigerant contained in them.
- (2) Cylinders shall be kept upright.
- (3) Ensure that the refrigeration system is earthed prior to charging the system with refrigerant.
- (4) Label the system when charging is complete (if not already).
- (5) Extreme care shall be taken not to overfill the refrigeration system.
- (6) Prior to recharging the system it shall be pressure tested with OFN. The system shall be leak tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

4.4.6 Decommissioning

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good practice that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to reuse of reclaimed refrigerant. It is essential that electrical power is available before the task is commenced:

- (1) Become familiar with the equipment and its operation.
- (2) Isolate system electrically.
- (3) Before attempting the procedure ensure that:
 - 1) Mechanical handling equipment is available, if required, for handling refrigerant cylinders.
 - 2) All personal protective equipment is available and being used correctly.
 - 3) The recovery process is supervised at all times by a competent person.
 - 4) Recovery equipment and cylinders conform to the appropriate standards.
- (4) Pump down refrigerant system, if possible.

- (5) If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
- (6) Make sure that cylinder is situated on the scales before recovery takes place.
- (7) Start the recovery machine and operate in accordance with manufacturer's instructions.
- (8) Do not overfill cylinders. (No more than 80% volume liquid charge).
- (9) Do not exceed the maximum working pressure of the cylinder, even temporarily.
- (10) When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.
- (11) Recovered refrigerant shall not be charged into another refrigeration system unless it has been cleaned and checked.

4.4.7 Labelling

Equipment shall be labelled stating that it has been decommissioned and emptied of refrigerant. The label shall be dated and signed.

4.4.8 Recovery

When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely.

When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge are available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i.e. special cylinders for the recovery of refrigerant).

Cylinders shall be complete with pressure relief valve and associated shut-off valves in good working order.

In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition. Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained Consult manufacturer if in doubt.

The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant Waste Transfer Notice arranged. Do not mix refrigerants in recovery units and especially not in cylinders.

If compressors or compressor oils are to be removed, ensure that they have been

evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The evacuation process shall be carried out prior to returning the compressor to the suppliers. Only electric heating to the compressor body shall be employed to accelerate this process. When oil is drained from a system, it shall be carried out safely.

4.5 After-Sales Services

Any quality or other issues encountered in the purchased air conditioner, please contact the local Boreal after-sales service department.

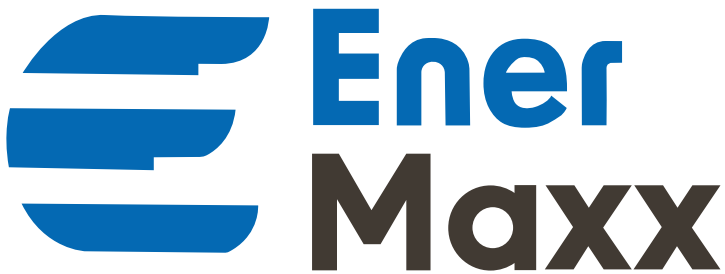
Boreal International a Watsco Inc. subsidiary

borealsales @borealintl.com, www.borealintl.com,

10300 NW 19th Street Suite 105 Doral, FL 33172, 786-621-8250



66139902786



OWNER'S MANUAL

Unitary Air Conditioner
INVERTER

Thank you for choosing our product.

For proper operation, please read and keep this manual carefully.

If you have lost the Owner's Manual, please contact the local agent or visit

www.borealintl.com or sent email to borealsales@borealintl.com for electronic version.

ENVBR36HPJ1OA

ENVBR60HPJ1OA

To Users

Thank you for selecting our product. Please read this instruction manual carefully before installing and using the product, so as to master and correctly use the product. In order to guide you to correctly install and use our product and achieve expected operating effect, we hereby instruct as below:

- (1) This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.
- (2) In order to ensure reliability of product, the product may consume some power under stand-by status for maintaining normal communication of system and preheating refrigerant and lubricant. If the product is not to be used for long, cut off the power supply; please energize and preheat the unit in advance before reusing it.
- (3) Please properly select the model according to actual using environment, otherwise it may impact the using convenience.
- (4) This product can't be installed at corrosive, inflammable or explosive environment or the place with special requirements, such as kitchen. Otherwise, it will affect the normal operation or shorten the service life of the unit, or even cause fire hazard or serious injury. As for above special places, please adopt special air conditioner with anti-corrosive or anti-explosion function.
- (5) If the product needs to be installed, moved or maintained, please contact our designated dealer or local service center for professional support. Users should not disassemble or maintain the unit by themselves, otherwise it may cause relative damage, and our company will bear no responsibilities.
- (6) All the illustrations and information in the instruction manual are only for reference. In order to make the product better, we will continuously conduct improvement and innovation. If there is adjustment in the product, please subject to actual product.

Exception Clauses

Manufacturer will bear no responsibilities when personal injury or property loss is caused by the following reasons:

- (1) Damage the product due to improper use or misuse of the product.
- (2) Alter, change, maintain or use the product with other equipment without abiding by the instruction manual of manufacturer.
- (3) After verification, the defect of product is directly caused by corrosive gas.
- (4) After verification, defects are due to improper operation during transportation of product.
- (5) Operate, repair, maintain the unit without abiding by instruction manual or related regulations.
- (6) After verification, the problem or dispute is caused by the quality specification or performance of parts and components that produced by other manufacturers.
- (7) The damage is caused by natural calamities, bad using environment or force majeure.

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This marking indicates that this product should not be disposed with other household wastes throughout the EU. To prevent possible harm to the environment or human health from uncontrolled waste disposal, recycle it responsibly to promote the sustainable reuse of material resources. To return your used device, please use the return and collection systems or contact the retailer where the product was purchased. They can take this product for environmental safe recycling.



1 Safety Precautions

WARNING

This product can't be installed at corrosive, inflammable or explosive environment or the place with special requirements, such as kitchen. Otherwise, it will affect the normal operation or shorten the service life of the unit, or even cause fire hazard or serious injury. As for above special places, please adopt special air conditioner with anti-corrosive or anti-explosion function.

Improper installation, adjustment, alteration, service, maintenance, or use can cause explosion, fire, electrical shock, or other conditions which may cause death, personal injury, or property damage. Consult a qualified installer, service agency, or your distributor or branch for information or assistance. The qualified installer or agency must use factory--authorized kits or accessories when modifying this product. Refer to the individual instructions packaged with the kits or accessories when installing. Follow all safety codes. Wear safety glasses, protective clothing, and work gloves. Use quenching cloth for brazing operations. Have fire extinguisher available. Read these instructions thoroughly and follow all warnings or cautions included in literature and attached to the unit. Consult local building codes and National Electrical Code (NEC) for special requirements. Recognize safety information. This is the safety--alert symbol .

When you see this symbol on the unit and in instructions or manuals, be alert to the potential for personal injury. Understand these signal words: **DANGER**, **WARNING**, **CAUTION** and **NOTICE**. These words are used with the safety--alert symbol.

 **DANGER** Indicates a hazardous situation that, if not avoided, will result in death or serious injury.

 **WARNING** Indicates a hazardous situation that, if not avoided, could result in death or serious injury.

 **CAUTION** Indicates a hazardous situation that, if not avoided, may result in minor or moderate injury.

NOTICE Indicates important but not hazard-related information, used to indicate risk of property damage.

WARNING

Electrical shock hazard:

Failure to follow this warning could result in personal injury or death.

Before installing, modifying, or servicing system, main electrical disconnect switch must be in the OFF position. There may be more than 1 disconnect switch. Lock out and tag switch with a suitable warning label.

WARNING

- (1) The air conditioner should be grounded to avoid electric shock. Do not connect the ground wire to gas pipe, water pipe, lightning arrester or telephone wire.
- (2) The appliance shall be stored in a well-ventilated area where the room size corresponds to the room area as specified for operation.
- (3) The appliance shall be stored in a room without continuously operating open flames (for example an operating gas appliance) and ignition sources (for example an operating electric heater).
- (4) According to federal/state/local laws and regulations, all packages and transportation materials, including nails, metal or wooden parts, and plastic packing material, must be treated in a safe way.

WARNING

- (1) Please install according to this instruction manual. Installation must be performed in accordance with the requirement of NEC and CEC by authorized personnel only.
- (2) Any person who is involved with working on or breaking into a refrigerant circuit should hold a current valid certificate from an industry-accredited assessment authority, which authorises their competence to handle refrigerants safely in accordance with an industry recognised assessment specification.
- (3) Servicing shall only be performed as recommended by the equipment manufacturer.
- (4) The appliance shall be installed in accordance with national wiring regulations.
- (5) The fixed wires connecting to the appliance must be configured with all-pole disconnection device under voltage grade III according to wiring rules.
- (6) Air conditioner should be stored with protective measures against mechanical damage caused by accident.
- (7) If the installation space for air conditioner pipe is too small, adopt a protective measure to prevent the pipe from physical damage.

⚠ WARNING

- (8) During installation, use the specialized accessories and components, otherwise water leakage, electric shock or fire hazard may occur.
- (9) Please install the air conditioner in a secure place that can withstand the weight of air conditioner. Insecure installation may cause the air conditioner falling down and lead to injury.
- (10) Be sure to adopt independent power circuit. If the power cord is damaged, it must be repaired by the manufacturer, service agent or other professional agents.
- (11) The air conditioner can be cleaned only after it is turned off and power-disconnected, otherwise electric shock may occur.
- (12) The air conditioner is not intended to be cleaned or maintained by children without supervision.
- (13) Do not alter the setting of pressure sensor or other protective devices. If the protective devices are short-circuited or changed against rules, fire hazard or even explosion may occur.
- (14) Do not operate the air conditioner with wet hands. Do not wash or sprinkle water on the air conditioner, otherwise malfunction or electric shock will occur.
- (15) Do not dry the filter with naked flame or an air blower; otherwise the filter will be out of shape.
- (16) If the unit is to be installed in a small space, please adopt protective measures to prevent the concentration of refrigerant from exceeding the allowable safety limit; excessive refrigerant leakage may lead to explosion.
- (17) When installing or re-installing the air conditioner, please keep the refrigerant circuit away from substances other than the specified refrigerant, such as air. Any presence of foreign substances will cause abnormal pressure change or even explosion, resulting in injury.

NOTICE

- (1) Do not put a finger or other objects into the air inlet or return air grill.
- (2) Please adopt safety protection measures before touching the refrigerant pipe; otherwise your hands may be hurt.
- (3) Please arrange the drain pipe according to the instruction manual.
- (4) Never stop the air conditioner by directly cutting off the power.
- (5) Please select the proper copper pipe according to the requirement for pipe thickness.

NOTICE

- (6) Never install the air conditioner in the following places:
 - a) Places with oil smoke or volatile liquid: plastic parts may deteriorate and fall off or even cause water leakage.
 - b) Places with corrosive gas: copper pipe or the welding parts may be corroded and cause refrigerant leakage.
- (7) Adopt proper measures to protect the outdoor unit from small animals because they may damage the electric components and cause malfunction of the air conditioner.

NOTICE

- (1) If thermostat is to be used, it should be connected first before powering up the unit, otherwise the thermostat may not be able to use.
- (2) Only use soft dry cloth or slightly wet cloth with neutral detergent to clean the casing of the air conditioner.
- (3) Before operating the unit under low temperature, connect it to power for 8 hours. If it is stopped for a short time, for example, one night, do not cut off the power (This is to protect the compressor).

2 Product Introduction

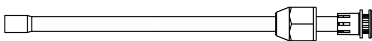
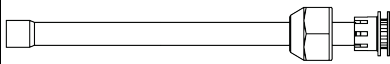
2.1 Operating Range

—	Cooling	Heating
Outdoor temperature	5°F(-15°C)~129.2°F (54°C)	-22°F (-30°C)~75.2°F (24°C)

2.2 Standard Accessories

Outdoor unit accessories				
No.	Name	Appearance	Q'ty	Usage
1	Drain plug		3	To plug the unused drain hole
2	Drainage connector	 or 	1	To connect with the hard PVC drain pipe

2.3 Optional Accessories

Outdoor unit accessories				
No.	Name	Appearance	Q'ty	Usage
1	Throw-over pipe		1	Connect the unit with the liquid pipe
2	Throw-over pipe		1	Connect the unit with the gas pipe

3 Installation

3.1 Installation Preparation

3.1.1 Selection of Installation Location

WARNING

- ①. The unit must be installed where strong enough to withstand the weight of the unit and fixed securely, otherwise the unit would topple or fall off.
- ②. Install the air conditioner at a place where the inclination is less than 5°.
- ③. Do not install where there is the danger of combustible gas leakage.
- ④. Do not install the unit at a place with leakage of inflammable gas.

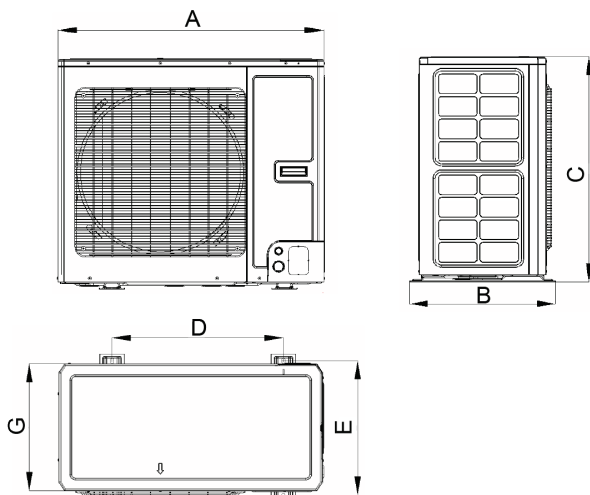
Selection of installation location for outdoor unit (Select a location pursuant to

the following condition).

- (1) Noise and air flow produced by the outdoor unit will not disturb the neighbors.
- (2) Select a location that is safe and away from animals and plants. If not, please add safety fences to protect the unit.
- (3) Install at a place with good ventilation. Make sure the outdoor unit stays at a well-ventilated place with no obstacles nearby that may obstruct the air inlet and outlet.
- (4) The installation location should be able to withstand the weight and vibration of outdoor unit and allow the installation to be carried out safely.
- (5) Avoid installing at a place with leakage of inflammable gas, oil smoke or corrosive gas.
- (6) Keep it away from strong wind because strong wind will affect the outdoor fan and lead to insufficient air flow volume and thus affecting the unit's performance.
- (7) Away from any object that may get the air conditioner generating noise.
- (8) Install the outdoor unit at a place where condensate can be easily drained.

3.1.2 Unit Dimension

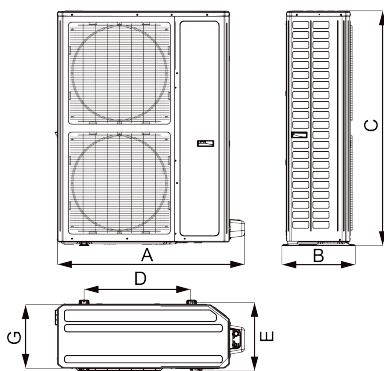
ENVBR36HPJ1OA .



Unit: inch(mm)

Dimensions Model	A	B	C	D	E	G
ENVBR36HPJ1OA	37 (940)	20-7/8 (530)	32-1/4 (820)	24 (610)	19-1/8 (486)	18-1/8 (460)

ENVBR60HPJ1OA



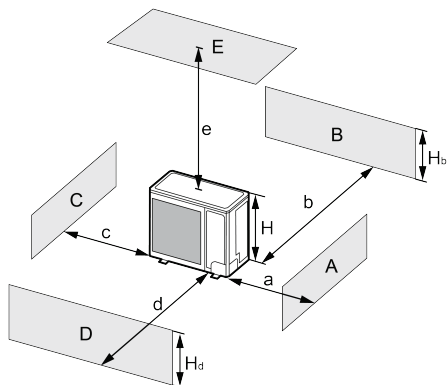
Unit: inch(mm)

Dimensions Model	A	B	C	D	E	G
ENVBR60HPJ1OA	42-3/4 (1085)	16-7/8 (427)	53-3/4 (1365)	24-1/2 (620)	15-1/2 (395)	14-1/2 (370)

3.1.3 Diagram of Unit Installation Space and Location

Diagram of installation space and location for outdoor unit (Notice: for best performance of the outdoor unit, make sure its installation space conforms to the following installation dimensions).

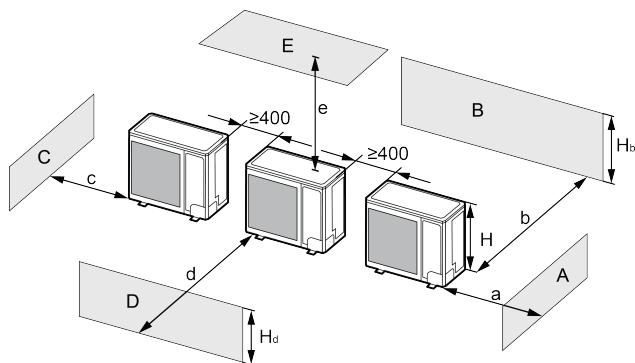
1) When one outdoor unit is to be installed.



A~E	H _b H _d H		(mm)				
			a	b	c	d	e
B	—		-	≥100	-	-	-
A,B,C,	—		≥300	≥100	≥100	-	-
B,E	—		-	≥100	-	-	≥1000
A,B,C,E	—		≥300	≥150	≥150	-	≥1000
D	—		-	-	-	≥1000	-
D,E	—		-	-	-	≥1000	≥1000
B,D	H _b < H _d	H _d > H	-	≥100	-	≥1000	-
	H _b > H _d	H _d < H	-	≥100	-	≥1000	-
B,D,E	H _b < H _d	H _b ≤ 1/2H	-	≥250	-	≥2000	≥1000
		1/2H < H _b ≤ H	-	≥250	-	≥2000	≥1000
		H _b > H	Prohibited				
	H _b > H _d	H _d ≤ 1/2H	-	≥100	-	≥2000	≥1000
		1/2H < H _d ≤ H	-	≥200	-	≥2000	≥1000
		H _d > H	Prohibited				

2) When two or more outdoor units are to be installed side by side.

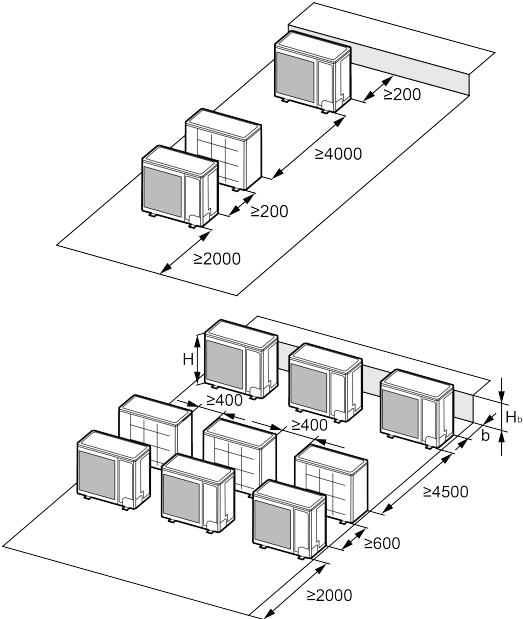
Unit: mm



A~E	H_b H_d H		(mm)				
			a	b	c	d	e
A,B,C	—		≥ 300	≥ 300	≥ 1000	-	-
A,B,C,E	—		≥ 300	≥ 300	≥ 1000	-	≥ 1000
D	—		-	-	-	≥ 2000	-
D,E	—		-	-	-	≥ 2000	≥ 1000
B,D	$H_b < H_d$	$H_d > H$	-	≥ 300	-	≥ 2000	-
	$H_b > H_d$	$H_d \leq 1/2H$	-	≥ 250	-	≥ 2000	-
		$1/2H < H_d \leq H$	-	≥ 300	-	≥ 2500	-
B,D,E	$H_b < H_d$	$H_b \leq 1/2H$	-	≥ 300	-	≥ 2000	≥ 1000
		$1/2H < H_b \leq H$	-	≥ 300	-	≥ 2500	≥ 1000
		$H_b > H$	Prohibited				
	$H_b > H_d$	$H_d \leq 1/2H$	-	≥ 250	-	≥ 2500	≥ 1000
		$1/2H < H_d \leq H$	-	≥ 300	-	≥ 2500	≥ 1000
		$H_d > H$	Prohibited				

3) When outdoor units are installed in rows.

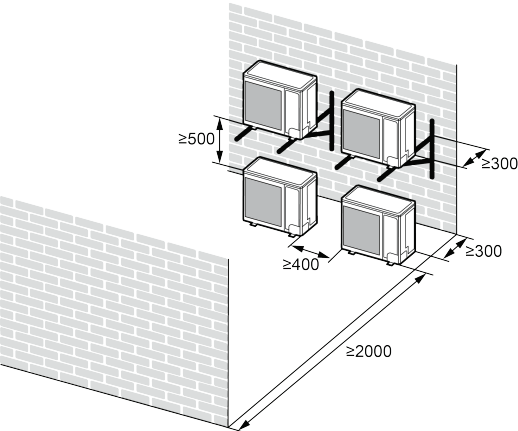
Unit: mm



H_b H	(mm)
$H_b \leq 1/2H$	$b \geq 250$
$1/2H < H_b \leq H$	$b \geq 300$
$H_b > H$	Prohibited

4) When outdoor units are installed one above another.

Unit: mm



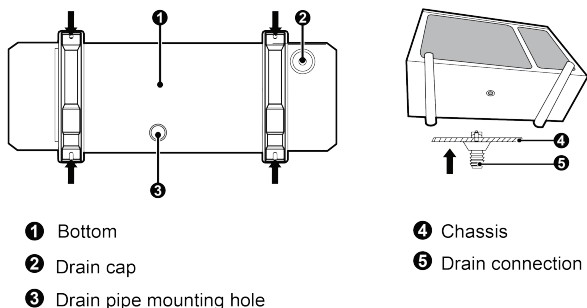
3.2 Unit Installation

NOTICE

The outdoor unit does not have a TXV (thermal expansion valve), please make sure there is a throttling valve (which throttles the unit when it operates in cooling mode and opens fully when it operates in heating mode) in the indoor unit (air handler or A coil).

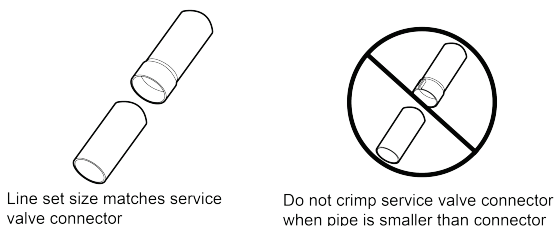
3.2.1 Outdoor Unit Installation

- (1) If the outdoor unit is installed on a solid ground such as concrete, use M10 screw bolts and nuts to secure the unit and make sure the unit stands erect and level.
- (2) If it vibrates and causes noise, please add rubber cushion between the outdoor unit and the installation base.
- (3) When the outdoor unit is in heating or defrosting, it needs to drain water. When installing the drain pipe, plug the accompanied drainage connector to the drainage hole on the chassis of the outdoor unit. Then connect a drain hose to the drainage connector (If drainage connector is used, the outdoor unit should be at least 10cm from the installation ground. See the following figures).
- (4) Plugs and drainage connector are not recommended if there is an electrical heater on the chassis.
- (5) For areas with frequent snowfall, please clean up the snow in time to avoid covering unit.
- (6) The unit installed in areas expecting snow are suggested to be raised with support frames
- (7) If possible, avoid locations that are likely to accumulate snow. if not possible, a snow guard should be installed on the unit to prevent accumulation of snow on the top of the unit.



3.2.2 Connection Pipe Installation

3.2.2.1 Installation Notice and Requirement on Connection Pipe



Installation method: Connect the connection pipes first to the unit. When bending a connection pipe, be careful not to damage the pipe. Do not over-tighten the screw nut, otherwise leakage will occur. Besides, the outside of connection pipe should be added with a layer of insulating cotton to protect it from mechanical damage during installation, maintenance and transportation.

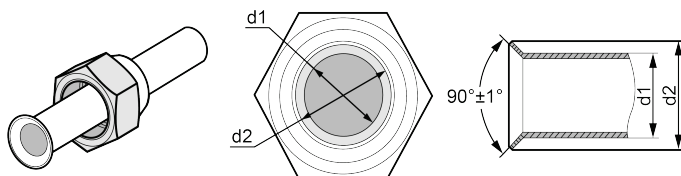
Model \ Item	Size of fitting pipe(inch)		Maximum pipe length feet(m)	Biggest drop between indoor and outdoor units feet(m)
	Liquid pipe	Gas pipe		
ENVBR36HPJ10A ENVBR60HPJ10A	Φ3/8	Φ3/4	98.4(30)	49.2(15)

Connection pipe should adopt water-proof insulating material. Its wall thickness should be 0.5-1.0mm and the pipe wall should be able to withstand 6.0MPa. The longer the connection pipe is the worse cooling and heating performance it has.

3.2.2.2 Pipe Flaring

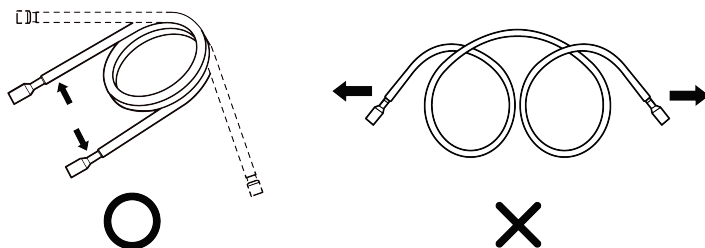
- (1) Cut the connection pipe with a pipe cutter.
- (2) The mouth of connection pipe should face downward. Remove burrs with the cut surface so that the chips do not enter the pipe.

- (3) Remove the cut-off valve of outdoor unit and take out the flare nut from the bag of indoor unit accessories. Then fit the flare nut on the pipe and use a flaring tool to flare the mouth of connection pipe.
- (4) Check whether the flaring part has cracked. (See the figure below).

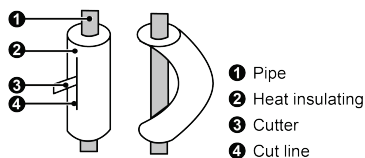


3.2.2.3 Pipe Bending

- (1) The pipes are shaped by your hands. Be careful not to collapse them.



- (2) Do not bend the pipes in an angle more than 90° .
- (3) If the pipe is repeatedly bent or extended, it will become hard and difficult to be bent or extended. So do not bend or extend the pipe for more than 3 times.
- (4) When bending the pipe, do not bend it excessively, otherwise it will get broken. As shown beside, use a sharp cutter to cut the heat insulating pipe and bend it after the pipe is exposed. After bending, place the heat insulating pipe back on the pipeline and fix it with adhesive tape.



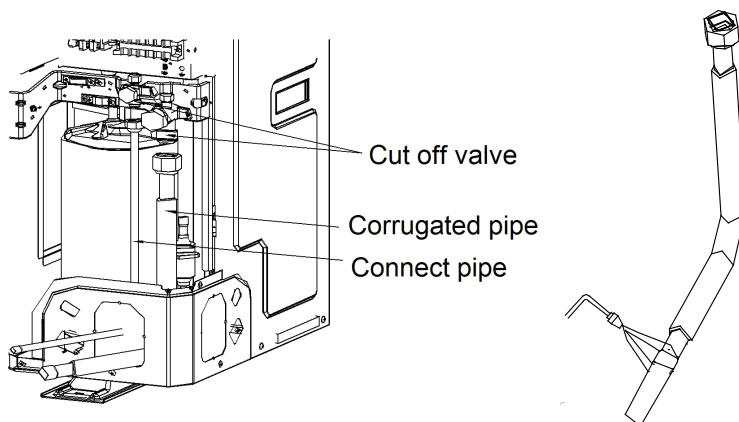
3.2.2.4 Connection Pipe of the Units

NOTICE

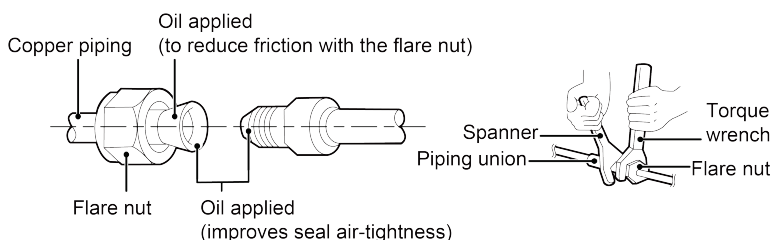
- ①. Connect the pipe to the unit. Please follow the instructions stated in the figures below. Use both spanner and torque wrench.
- ②. When connecting the tapered screw nut, first apply chilled machine oil on its inner and outer surface and then screw it up for 3~4 circles.
- ③. Confirm the tightening torque by referring to the following table (If the screw nut is over-twisted, it may be damaged and cause leakage).
- ④. Check whether gas leakage occurs to the connection pipe and then apply thermal insulation, as shown below.
- ⑤. Wind sponge around the joint of gas pipe and heat insulation sheath of gas collecting pipe.
- ⑥. Be sure to connect gas pipe after liquid pipe is connected.
- ⑦. Be sure to have insulation for gas pipe. Insulation for liquid pipe is optional.

3.2.2.4.1 Solder Connection

Screw on the flare nut of the flaring connecting pipe on the outdoor unit valve.



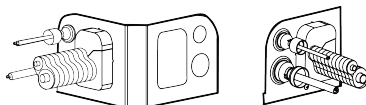
3.2.2.4.2 Screw Connection



Pipe diameter (inch)	Tightening torque (N·m)
Φ1/4	15-30
Φ3/8	35-40
Φ1/2	45-50
Φ5/8	60-65
Φ3/4	70-75
Φ7/8	80-85

3.2.2.5 Sealing of the Knock-off Hole

As for the built-in valve model, during the installation process for connection pipe, when the connection pipe is passing through the knock-off hole, conduct sealing with insulated cotton in the knock-off hole of outdoor unit to prevent small animals from entering. See the following figures.



3.2.3 Connection Pipe Vacuum Pumping and Leak Detection

3.2.3.1 Vacuum Pumping

NOTICE

- ① Make sure the outlet of vacuum pump is away from fire source and is well-ventilated.
- ② Before vacuum pumping, make sure the unit cut-off valves are closed.
- ③ When vacuum pumping, both the liquid pipe and the gas pipe must be pumped.

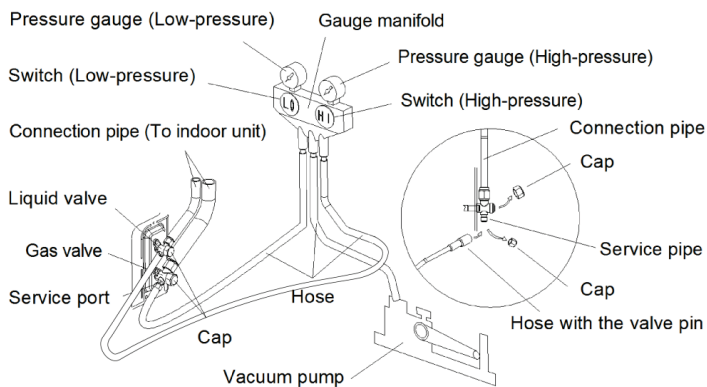
- (1) Remove the caps of the liquid valve, gas valve and also the service port.
- (2) Connect the hoses at the low pressure and high pressure sides of the manifold valve assembly to the service ports of the unit's gas valve and liquid valve, and meanwhile the gas and liquid valves should be kept closed in case of refrigerant leak.
- (3) Connect the hose used for evacuation to the vacuum pump.
- (4) Open the switch at the low pressure and high pressure side of the manifold valve at the same time, assembly and start the vacuum pump.

- (5) The evacuation duration depends on the unit's capacity, generally.

Model	Time(min)
ENVBR36HPJ1OA	30
ENVBR60HPJ1OA	45

And verify if the pressure gauge at the low pressure side of the manifold valve assembly reads -0.1MPa, if not, it indicates there is leak somewhere. Then, close the switch fully and then stop the vacuum pump.

- (6) Wait for 10min to see if the system pressure can remain unchanged. During this time, the reading of the pressure gauge at the low pressure side can not be larger than 0.005MPa.
- (7) Slightly open the liquid valve and let some refrigerant go to the connection pipe to balance the pressure inside and outside of the connection pipe, so that air will not come into the connection pipe when removing the hose. Note that the gas and liquid valve can be opened fully only after the manifold valve assembly is removed.
- (8) Place back the caps of the liquid valve, gas valve and also the service port.



NOTICE

For large-size units, there are maintenance ports for liquid valve and gas valve. During evacuation, you may connect the two hoses of the branch valve assembly to the maintenance ports to speed up the evacuation.

3.2.4 Refrigerant Adding

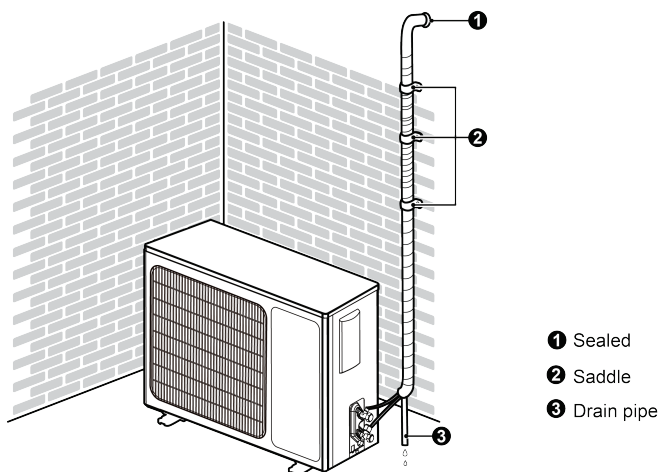
See the following table for the amount of additional refrigerant.

Model \ Item	Standard pipe length	Unnecessary charge pipe length	Additional refrigerant amount for extra pipe
ENVBR36HPJ1OA ENVBR60HPJ1OA	7.5m	≤9.5m	30g/m

3.2.5 Installation of Drain Pipe

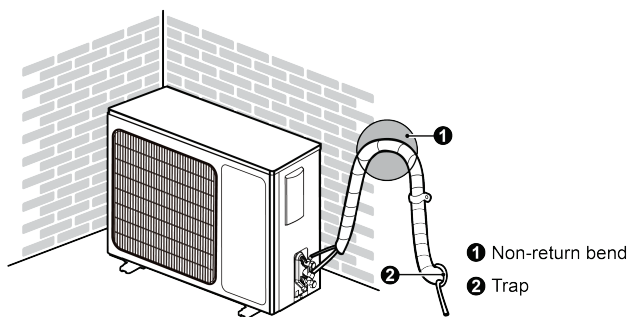
3.2.5.1 Outdoor Side Drainage Pipe

- (1) If the outdoor unit is underneath the indoor unit, arrange the pipeline according to the following diagram.
 - 1) Drain hose should be placed on the ground and its end should not be immersed into water. The whole pipeline should be supported and fixed onto the wall.
 - 2) Wind the insulating tape from bottom to top.
 - 3) The whole pipeline should be wound with insulating tape and fixed onto the wall with saddles.



- (2) If the outdoor unit is above the indoor unit, arrange the pipeline according to the following diagram.
 - 1) Wind the insulating tape from bottom to top.

- 2) The whole pipeline should be wound together to avoid water returning to the room.
- 3) Use saddles to fix the whole pipeline onto the wall.



3.3 Electrical Installation

3.3.1 Requirement and Notice on Electrical Installation

⚠ WARNING

The electrical installation for the air conditioner should observe the following requirements:

- ①. The electrical installation must be conducted by professionals in compliance with local laws and regulations and the instructions in this manual. Never extend the power cords. The electric circuit must be equipped with a circuit breaker and air switch both with sufficient capacity.
- ②. The unit's operating power must be within the nominal range stated in the instruction manual. Use a specialized power circuit for the air conditioner. Do not draw power from another power circuit.
- ③. The air conditioner circuit should be at least 1.5m away from any inflammable surface.
- ④. The external power cords, the thermostat wires and outdoor unit must be effectively fixed.
- ⑤. The external power cords, the thermostat wires and outdoor unit can't directly contact any hot objects. For example: they must not contact chimney pipes, warm gas pipes or other hot objects.
- ⑥. The external power cords, and the thermostat wires and outdoor unit must not be squeezed. Never pull, stretch or bend the wires.

- ⑦. The external power cords, the thermostat wires and outdoor unit must not collide with any metal beam or edge on the ceiling, or touch any metal burrs or sharp metal edge around.
- ⑧. Connect wires correspondingly by referring to the circuit diagram labeled on the unit or electric box. Screws must be tightened up. Slipped screws must be replaced by specialized flat-head screws.
- ⑨. Wiring terminals should be connected firmly to the terminal board. Loose connection is forbidden.
- ⑩. The wire gauge of power cords should be large enough. Damaged power cords or other wires must be replaced by specialized wires. Wiring work must be done according to national wiring rules and regulations.
- ⑪. This outdoor unit has a heating four-way valve.

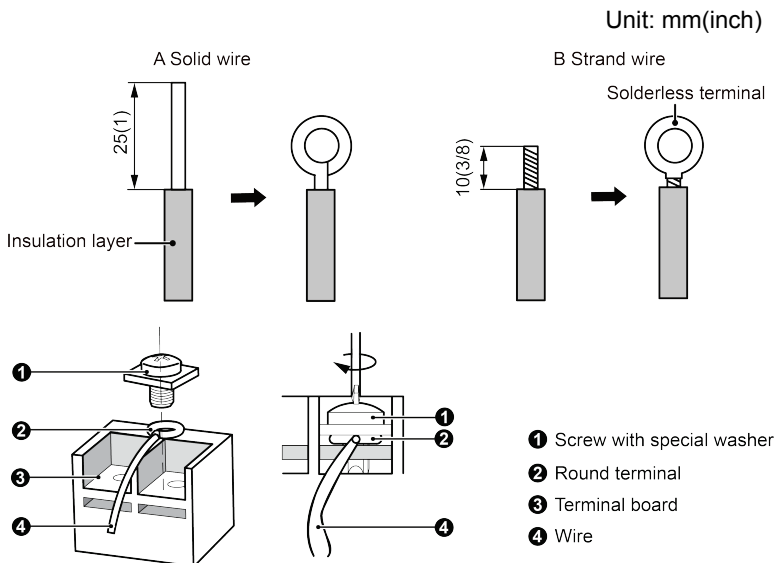
3.3.2 Electrical Parameters

Model	Power supply	Fuse capacity (A)	Maximum over-current protection (A)	Minimum circuit ampacity (A)
ENVBR36HPJ1OA	208/230V-1Ph-60Hz	35	35	24
ENVBR60HPJ1OA	208/230V-1Ph-60Hz	45	45	35

3.3.3 Connection of Power Cords and Thermostat Wires

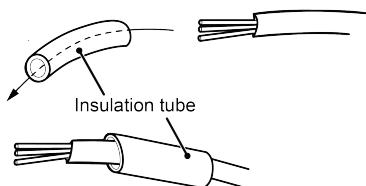
- (1) For solid wires (as shown below):
 - 1) Use wire cutters to cut off the wire end and then peel away about 25mm of the insulation layer.
 - 2) Use a screwdriver to unscrew the terminal screw on the terminal board.
 - 3) Use nippers to bend the solid wire into a ring that fits the terminal screw.
 - 4) Form a proper ring and then put it on the terminal board. Use a screwdriver to tighten up the terminal screw.
- (2) For strand wires (as shown below):
 - 1) Use wire cutters to cut off the wire end and then peel away about 10mm of the insulation layer.
 - 2) Use a screwdriver to unscrew the terminal screw on the terminal board.

- 3) Use a round terminal fastener or clamp to fix the round terminal firmly on the peeled wire end.
- 4) Locate the round terminal conduit. Use a screwdriver to replace it and tighten up the terminal screw (as shown below).



- (3) How to connect the thermostat wires and power cords.

Lead the thermostat wires and power cords through the insulation tube (as shown in the following figure).

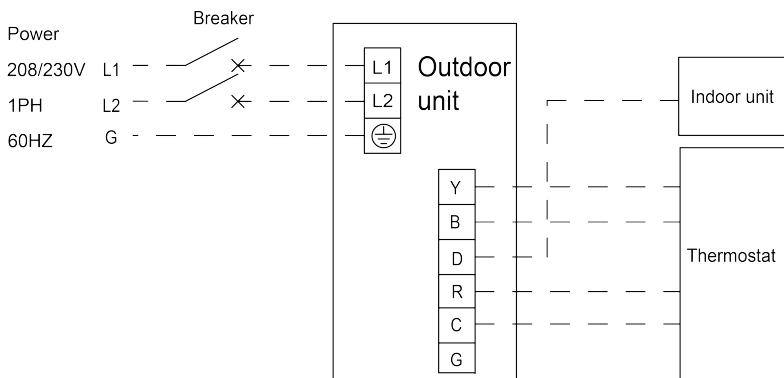


⚠ WARNING

- ①. Before working, please check whether the units are powered on.
- ②. Wrong wire connection may burn the electrical components.
- ③. Connect the wires firmly to the wiring box. Incomplete installation may lead to fire hazard.
- ④. Ground wire should be connected.

Wires of outdoor units

Single-phase unit: ENVBR36HPJ10A , ENVBR60HPJ10A .



NOTE: Y means Compressor control signal;

B which is energized under the heating mode means 4-way valve control signal;

D means defrosting signal;

R means 24V AC power supply;

C means 24V common.

NOTE: When outdoor defrosts, D of outdoor unit will send 24V signal to avoid cold winds.

NOTE: As for the indoor unit which do not include D, there is no need to connect the D terminals.

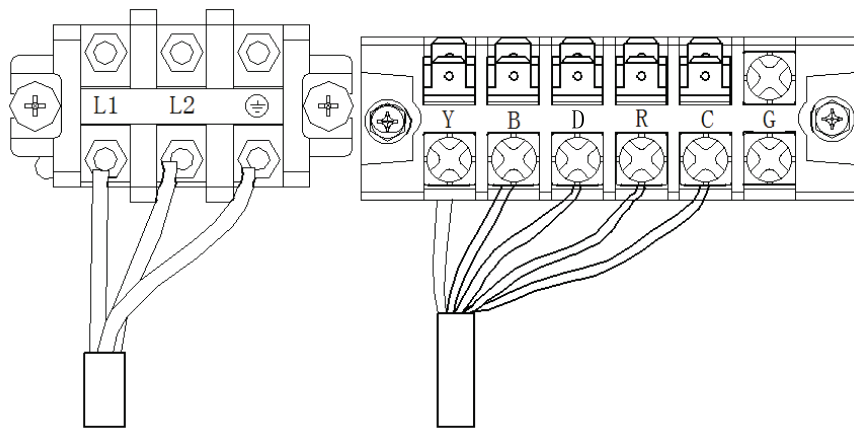
⚠ WARNING

- ①. High and low voltage wires should be led through different rubber rings of the front plate.
- ②. Do not bundle up the thermostat wires or lay them side by side, otherwise errors will occur.
- ③. High and low voltage wires should be secured separately.
- ④. Use screws to tighten up the thermostat wires and power cords of the units on the terminal board. Wrong connection may lead to fire hazard.
- ⑤. If the thermostat wires of the units and power cords are not correctly connected, the air conditioner may get damaged.
- ⑥. Ground the units through connecting the ground wire.
- ⑦. The units should comply with applicable local and national rules and regulations on power consumption.

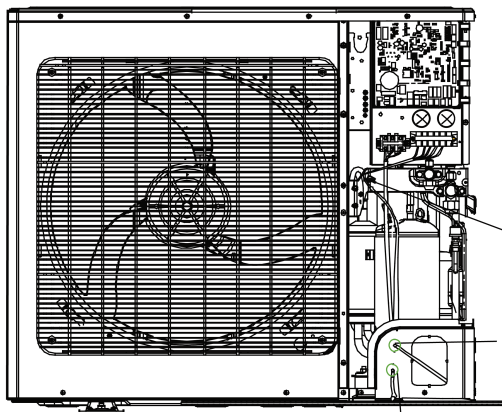
⚠ WARNING

- ⑧. When connecting the power cords, make sure the phase sequence of the power supply matches with the corresponding terminals, otherwise the compressor will get reversed and operate abnormally.

Remove the big handle/front panel of the outdoor unit and insert one end of the thermostat cord and the power cord to the terminal board.



Single-phase unit: ENVBR36HPJ10A

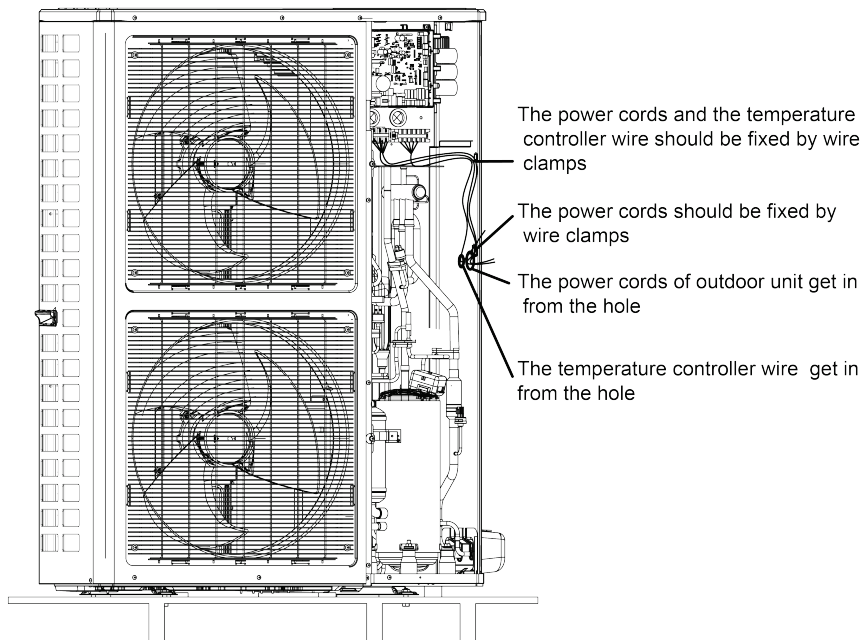


The wires here should be bundled with a tieline.

The temperature controller wire gets in from the upper hole.

The power cords of outdoor unit get in from the lower hole.

Single-phase unit: ENVBR60HPJ10A .



3.4 Check after Installation

Check Items after Installation

Check items	Possible events due to improper installation
Is the main body installed securely?	The unit may fall down, vibrate or produce noise.
Did you do water leakage test?	Cooling capacity may become unsatisfactory.
Is the unit well insulated from heat?	Condensate, water drops may occur.
Does water drainage go well?	Condensate, water drops may occur.
Is the voltage consistent with that stated on the nameplate?	The unit may fail or its components may get burned.
Are the wires and pipes installed correctly?	The unit may fail or its components may get burned.
Has the unit been safely grounded?	Risk of electric leakage.

Check items	Possible events due to improper installation
Do the specifications of wires comply with the requirement?	The unit may fail or its components may get burned.
Is there any obstacle blocking the air inlet and outlet of the units?	Cooling capacity may become unsatisfactory.
Have you recorded the length of refrigerant pipe and the refrigerant charging amount?	The refrigerant charging amount can't be controlled.

3.5 Test Running

Preparation before connecting the power:

- (1) Power must not be connected if the installation work is not completed.
- (2) Control circuit is correct and all the wires are firmly connected.
- (3) Cut-off valves of the gas pipe and liquid pipe are open.
- (4) The inside of the unit should be clean. Take irrelevant objects out if there is any.
- (5) After checking, re-install the front side plate.

Operation after connecting the power:

- (1) If all the above works are finished, power on the unit.
- (2) If the outside temperature is more than 30°C, heating mode can't be enabled.
- (3) Before test operation, make sure unit is power on and compressor has been preheated for more than 8 hours. Touch the unit to check whether it's normally preheated. Start test operation after unit is normally preheated, otherwise compressor might be damaged. Debugging must be performed by professional technicians or under the guide of professional technicians.
- (4) Make sure the units can run normally.
- (5) If there's sound of liquid shock when the compressor is running, then stop the air conditioner immediately. Wait until the electric heating belt is heated enough, and then restart the air conditioner.

NOTICE

- ① If you use thermostat to turn off the unit and then immediately turn the unit on again, compressor will need 3min to restart. Even if you press "ON/OFF" button on the thermostat, it won't be started up right away.

- ②. If there's no display on the thermostat, it's probably because the connection wires between the units and the thermostat are not connected. Please check again.

4 Maintenance

4.1 Failures Not Caused by Faults of the AC

If your air conditioner fails to function normally, please first check the following items before maintenance:

Problem	Cause	Corrective measure
The air conditioner can't run.	If you turn off the unit and then immediately turn it on, in order to protect the compressor and avoid system overload, compressor will delay running for 3min.	Please wait for a while.
	Wire connection is wrong.	Connect wires according to the wiring diagram.
	Fuse or circuit breaker is broken.	Replace the fuse or switch on the circuit breaker.
	Power failure.	Restart after power is resumed.
	Power plug is loose.	Re-insert the power plug.
Bad cooling or heating effect.	Air inlet and outlet of the units have been blocked.	Clear the obstacles and keep the room for the units well ventilated.
	Improper temperature setting	Reset a proper temperature.
	Fan speed is too low.	Reset a proper fan speed.
	Air flow direction is not right.	Change the direction of air louvers.
	Doors or windows are open.	Close them.
	Exposed under direct sunshine.	Put on curtains or louvers in front of the windows.
	Too many heat sources in the room.	Remove unnecessary heat sources.
	Filter is blocked or dirty.	Send for a professional to clean the filter.
	Air inlets or outlets of the units are blocked.	Clear away obstacles that are blocking the air inlets and outlets of the units.

The following situations are not operation failures.

Problem	Time of occurrence	Cause
Mist comes from the air conditioner.	During operation.	If the unit is running under high humidity, the wet air in the room will be quickly cooled down.
The air conditioner generates some noise.	System switches to heating mode after defrosting.	Defrosting process will generate some water, which will turn to water vapor.
	The air conditioner is buzzing at the beginning of operation.	Thermostat will be buzzing when it starts working. The noise will become weak 1min later.
Dust comes from the air conditioner.	When the unit is turned on, it purrs.	When the system is just started, the refrigerant is not stable. About 30s later, the purr of the unit becomes low.
	About 20s after the unit first enables the heating mode or there is refrigerant brushing sound when defrosting under heating.	It's the sound of 4-way valve switching direction. The sound will disappear after the valve changes its direction.
	There is hissing sound when the unit is started or stopped and a slight hissing sound during and after operation.	It's the sound of gaseous refrigerant that stops flowing and the sound of drainage system.
	There is a sound of crunching during and after operation.	Because of temperature change, front panel and other components may be swelled up and cause abrasion sound.
	There is a hissing sound when the unit is turned on or suddenly stopped during operation or after defrosting.	Because refrigerant suddenly stops flowing or changes the flow direction.
	The unit starts operation after being unused for a long time.	Dust inside the units come out together with the air.

Problem	Time of occurrence	Cause
The air conditioner generates some smell.	During operation.	The room smell or the smell of cigarette comes out through the units.

NOTICE

Check the above items and adopt the corresponding corrective measures. If the air conditioner continues to function poorly, please stop the air conditioner immediately and contact Boreal's authorized local service center. Ask our professional service staff to check and repair the unit.

4.2 Error Code

 WARNING	
①.	If abnormal things (for example, awful smell) occur, please stop the unit immediately and disconnect power. Then contact Boreal's authorized service center. If the unit continues to run in abnormal situations, it may get damaged and cause electric shock or fire hazard.
②.	Do not repair the air conditioner by yourself. Improper maintenance will cause electric shock or fire hazard. Please contact Boreal's authorized service center and send for professional service staff to repair.

If the LED displayer on mainboard of outdoor unit displays an error code, please refer to the error code meaning stated in the following table.

No.	Error code	Error
1	E1	Compressor high-pressure protection
2	E3	Compressor low-pressure protection.
3	E4	Compressor air discharge high-temperature protection.
4	F2	Condenser temperature sensor error
5	F3	Outdoor ambient temperature sensor error
6	F4	Discharge temperature sensor error
7	F6	ODU tube temperature sensor error
8	EE	ODU memory chip error
9	H4	Overload
10	H5	IPM protection
11	H6	DC fan error
12	H7	Driver out-of-step protection
13	HC	PFC protection
14	Lc	Startup failure

No.	Error code	Error
15	P0	Driver reset protection
16	P5	Over-current protection
17	P6	Master control and driver communication error
18	P7	Driver module sensor error
19	P8	Driver module high temperature protection
20	PA	AC current protection
21	Pc	Driver current error
22	PL	Bus low-voltage protection
23	PH	Bus high-voltage protection
24	PU	Charge loop error
25	ee	Drive memory chip error
26	e1	High pressure sensor error
27	C4	ODU jumper cap error

4.3 Unit Maintenance

WARNING

- ①. Only professionals are allowed to carry on daily maintenance.
- ②. Before contacting any wire, make sure power is cut off.
- ③. Do not let any inflammable objects near the unit.
- ④. Do not use organic solvent to clean the air conditioner.
- ⑤. If you need to replace a component, please ask a professional to repair with a component supplied by the original manufacturer so as to ensure the unit's quality.
- ⑥. Improper operation may get the unit broken, hit by electric shock or cause fire.
- ⑦. Do not make the air conditioner wet or electric shock may be lead, ensure that the air conditioner will not be cleaned by water rinsing under any circumstance.

NOTICE

- ①. Before cleaning, please make sure the unit is stopped. Cut the circuit breaker and remove the power socket, otherwise, electric shock may occur.
- ②. Do not wash the air conditioner with water, otherwise fire hazard or electric shock may occur.
- ③. When cleaning the filter, please be careful of your steps. If you need to work high above the ground, please be extremely careful.

4.3.1 Heat Exchanger of Outdoor Unit

Conduct cleaning for the heat exchanger of outdoor unit periodically, clean it once at least in every two months. Clean the dust and sundries on the surface of the heat exchanger with dust collector and nylon brush, if there's compressed air source; use the compressed air to blow the dust on the surface of the heat exchanger. Don't use tap water for cleaning.

4.3.2 Drainage Pipe

Periodically check if the drainage pipe is blocked to smooth the condensate water.

4.3.3 Notices at the Beginning of the Using Season

- (1) Check if the air inlet/outlet of the units are blocked.
- (2) Check if the ground connection is reliable.
- (3) Check if the air filter screen is properly installed.
- (4) If starting up again after long-term shut down, preset the power switch of air conditioner to "ON" status before 8h of operation, to preheat the crankcase of outdoor compressor.
- (5) Check if the installation of outdoor unit is firm, if not, please contact with Boreal appointed maintenance center.

4.3.4 Maintenance at the End of the Using Season

- (1) Cut off the main power of air conditioner.
- (2) Clean the dust and sundries in outdoor unit.
- (3) If the outdoor unit is rusty, coat the rusty location with paint to prevent it from expanding.

4.3.5 Components Replacement

Components are available in Boreal agency or Boreal distributors nearby.

4.4 Notice on Maintenance

4.4.1 Information on Servicing

The manual shall contain specific information for service personnel who shall be instructed to undertake the following when servicing an appliance that employs a flammable refrigerant.

4.4.1.1 General Work Area

All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out. Work in confined spaces shall be avoided. The area around the workspace shall be sectioned off. Ensure that the conditions within the area have been made safe by control of flammable material.

4.4.1.2 Ventilated Area

Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

4.4.1.3 Checks to the Refrigeration Equipment

Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times the manufacturer's maintenance and service guidelines shall be followed. If in doubt consult the manufacturer's technical department for assistance.

The following checks shall be applied to installations using flammable refrigerants:

- (1) The ventilation machinery and outlets are operating adequately and are not obstructed.
- (2) If an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant.
- (3) Marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected.
- (4) Refrigeration pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

4.4.1.4 Checks to electrical devices

Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment so all parties are advised.

Initial safety checks shall include:

- (1) Those capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking.
- (2) That no live electrical components and wiring are exposed while charging, recovering or purging the system.
- (3) That there is continuity of earth bonding.

4.4.2 Repairs to Sealed Components

4.4.2.1 Electrical Safety

From the equipment being worked upon prior to any removal of sealed covers, etc. If it is absolutely necessary to have an electrical supply to equipment during servicing, then a permanently operating form of leak detection shall be located at the most critical point to warn of a potentially hazardous situation.

4.4.2.2 Particular Attention

Electrical components, the casing is not altered in such a way that the level of protection is affected. This shall include damage to cables, excessive number of connections, terminals not made to original specification, damage to seals, incorrect fitting of glands, etc.

Ensure that apparatus is mounted securely.

Ensure that seals or sealing materials have not degraded such that they no longer serve the purpose of preventing the ingress of flammable atmospheres. Replacement parts shall be in accordance with the manufacturer's specifications.

NOTICE

The use of silicon sealant may inhibit the effectiveness of some types of leak detection equipment. Intrinsically safe components do not have to be isolated prior to working on them.

4.4.3 Repair to Intrinsically Safe Components

Do not apply any permanent inductive or capacitance loads to the circuit without ensuring that this will not exceed the permissible voltage and current permitted for the equipment in use.

Intrinsically safe components are the only types that can be worked on while live in the presence of a flammable atmosphere. The test apparatus shall be at the correct rating.

Replace components only with parts specified by the manufacturer. Other parts may result in the ignition of refrigerant in the atmosphere from a leak.

4.4.4 Cabling

Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. The check shall also take into account the effects of ageing or continual vibration from sources such as compressors or fans.

4.4.5 Charging Procedures

In addition to conventional charging procedures, the following requirements shall be followed.

- (1) Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimize the amount of refrigerant contained in them.
- (2) Cylinders shall be kept upright.
- (3) Ensure that the refrigeration system is earthed prior to charging the system with refrigerant.
- (4) Label the system when charging is complete (if not already).
- (5) Extreme care shall be taken not to overfill the refrigeration system.
- (6) Prior to recharging the system it shall be pressure tested with OFN. The system shall be leak tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

4.4.6 Decommissioning

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good

practice that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to reuse of reclaimed refrigerant. It is essential that electrical power is available before the task is commenced:

- (1) Become familiar with the equipment and its operation.
- (2) Isolate system electrically.
- (3) Before attempting the procedure ensure that:
 - 1) Mechanical handling equipment is available, if required, for handling refrigerant cylinders.
 - 2) All personal protective equipment is available and being used correctly.
 - 3) The recovery process is supervised at all times by a competent person.
 - 4) Recovery equipment and cylinders conform to the appropriate standards.
- (4) Pump down refrigerant system, if possible.
- (5) If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
- (6) Make sure that cylinder is situated on the scales before recovery takes place.
- (7) Start the recovery machine and operate in accordance with manufacturer's instructions.
- (8) Do not overfill cylinders. (No more than 80% volume liquid charge).
- (9) Do not exceed the maximum working pressure of the cylinder, even temporarily.
- (10) When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.
- (11) Recovered refrigerant shall not be charged into another refrigeration system unless it has been cleaned and checked.

4.4.7 Labelling

Equipment shall be labelled stating that it has been decommissioned and emptied of refrigerant. The label shall be dated and signed.

4.4.8 Recovery

When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely.

When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge are available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i.e. special cylinders for the recovery of refrigerant).

Cylinders shall be complete with pressure relief valve and associated shut-off valves in good working order.

In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition. Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained Consult manufacturer if in doubt.

The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant Waste Transfer Notice arranged. Do not mix refrigerants in recovery units and especially not in cylinders.

If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The evacuation process shall be carried out prior to returning the compressor to the suppliers. Only electric heating to the compressor body shall be employed to accelerate this process. When oil is drained from a system, it shall be carried out safely.

4.5 After-Sales Services

Any quality or other issues encountered in the purchased air conditioner, please contact the local Boreal after-sales service department.

Boreal International a Watsco Inc. subsidiary

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