

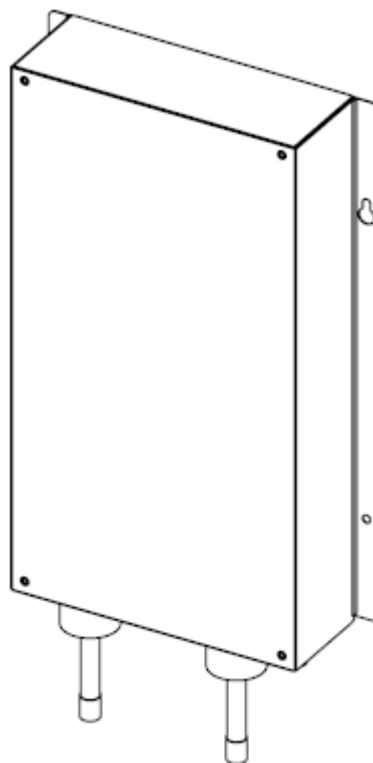
## Dx-Interface : Dx-PMV kit Installation manual

Model name:

For commercial use

<b>RBM-A0121GUL</b>	Dx-PMV kit (012type)
<b>RBM-A0301GUL</b>	Dx-PMV kit (030type)
<b>RBM-A0601GUL</b>	Dx-PMV kit (060type)
<b>RBM-A0961GUL</b>	Dx-PMV kit (096type)
<b>RBM-A1921GUL</b>	Dx-PMV kit (192type)

**ENGLISH**



Please read this Installation Manual carefully before installing the Dx-Interface system.

- This Manual describes the installation method of the Dx-PMV kit.
- You must also refer to the Installation manual of Dx-Controller (TCB-IFDA1GUL or TCB-IFDD1GUL) and Installation and Owner's Manual attached to Toshiba Carrier VRF outdoor unit.
- Please follow the manual(s) for your local supplied products.
- Toshiba Carrier North America, Inc. does not take any responsibility on the local design.
- This product is exclusively designed to be connected to a field supplied 3<sup>rd</sup> party Dx-coil.

**ADOPTION OF NEW REFRIGERANT**

This Air Conditioner is a new type which adopts a new refrigerant HFC (R410A) instead of the conventional refrigerant R22 in order to prevent destruction of the ozone layer.

This appliance is for commercial use only and should not be accessible to the general public.  
This appliance is not intended for use by person (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.  
Children should be supervised to ensure that they do not play with the appliance.

**Contents**

<b>1</b>	<b>PRECAUTIONS FOR SAFETY .....</b>	<b>2</b>
<b>2</b>	<b>OVERVIEW OF DX INTERFACE / DX-PMV KIT .....</b>	<b>4</b>
<b>3</b>	<b>SUPPLIED PARTS .....</b>	<b>5</b>
<b>4</b>	<b>PARTS DESCRIPTION. ....</b>	<b>5</b>
<b>5</b>	<b>INSTALLATION .....</b>	<b>6</b>

# 1 PRECAUTIONS FOR SAFETY

The manufacturer shall not assume any liability for the damage caused by not observing the description of this manual.

## General

- Before starting to install the air conditioner, read through the Installation Manual carefully, and follow its instructions to install the air conditioner.
- Only qualified installer or service person is allowed to do installation work. Inappropriate installation may result in water leakage, electric shock or fire.
- Do not use any refrigerant different from the one specified for complement or replacement. Otherwise abnormally high pressure may be generated in the refrigerant cycle, which may result in a failure or explosion of the product or an injury to your body.
- Before opening the electrical control box or service panel of outdoor unit, set the circuit breaker to the OFF position. Failure to set the circuit breaker to the OFF position may result in electric shocks through contact with the interior parts. Only a qualified installer or qualified service person is allowed to remove the electrical control box cover or service panel of the outdoor unit and do the work required.
- Before carrying out the installation, maintenance, repair or removal work, set the circuit breaker to the OFF position. Otherwise, electrical shocks may result.
- Place a "Work in Progress" sign near the circuit breaker while the installation, maintenance, repair or removal work is being carried out. There is a danger of electric shocks if the circuit breaker is set to ON by mistake.
- Wear protective gloves and safety work clothing during installation, servicing and removal.
- The refrigerant used by this air conditioner is the R410A.

## Selection of installation location

- When the air conditioner is installed in a small room, provide appropriate measures to ensure that the concentration of refrigerant leakage occur in the room does not exceed the critical level.
- Do not install in a location where flammable gas leaks are possible. If the gas leak and accumulate around the unit, it may ignite and cause a fire.
- Do not place any combustion appliance in a place where it is directly exposed to the wind of air conditioner. Otherwise, it may cause imperfect combustion.

## Installation

- Install the air conditioner securely in a location where the base can sustain the weight adequately. If the strength is not enough, the unit may fall down and result in injury.
- Carry out the specified installation work to guard against the possibility of high winds and earthquake. If the air conditioner is not installed appropriately, a unit may topple over or fall down, causing an accident.
- If refrigerant gas has leaked during the installation work, ventilate the room immediately. If the leaked refrigerant gas comes in contact with fire, noxious gas may be generated.

## Refrigerant piping

- Install the refrigerant pipe securely during the installation work before operating the air conditioner. If the compressor is operated with the valve open and without refrigerant pipe, the compressor sucks air and the refrigeration cycles is over pressurized, which may cause a injury.
- After the installation work, confirm that refrigerant gas does not leak. If refrigerant gas leaks into the room and flows near a fire source, such as a cooking range, noxious gas may be generated.
- When the air conditioner has been installed or relocated, follow the instruction in the Installation manual and purge the air completely so that no gases other than the refrigerant will be mixed in the refrigeration cycle. Failure to purge the air completely may cause the air conditioner to malfunction.
- Nitrogen gas must be used for the airtight test.
- The charge hose must be connected in such a way that it is not slack.

## Electrical wiring

- Only a qualified installer or qualified service person is allowed to carry out the electrical work of the air conditioner. Under no circumstances must this work be done by an unqualified individual since failure to carry out the work properly may result in electric shocks and/or electrical leaks.
- To connect the electrical wires, repair the electrical parts or undertake other electrical jobs, wear gloves to provide protection for electricians, insulating shoes and clothing to provide protection from electric shocks.
- Use wiring that meets the specifications in the Installation Manual and the stipulations in the local regulations and laws. Using wiring which does not meeting the specifications may lead electric shocks, electrical leakage, smoking and/or a fire.
- Connect earth wire. (Grounding work)

- Incomplete grounding causes an electric shock.
- Do not connect earth wires to gas pipes, water pipes, and lightning conductor or telephone earth wires.
- After completing the repair or relocation work, check that the earth wires are connected properly.
- Install a circuit breaker that meets the specifications in the installation manual and the stipulations in the local regulations and laws.
- Install the circuit breaker where it can be easily accessed for service.
- When installing the circuit breaker outdoors, install one which is designed to used outdoors.
- The power wire must not be extended. Connection trouble in the places where the wire is extended may result in smoking and/or fire.
- Electrical wiring work shall be conducted according to law and regulation in the community and installation manual. Failure to do so may result in electrocution or short circuit.

### Test run

- Before operating the air conditioner after having completed the work, check that the electrical cover box and service panel of outdoor unit are closed, and set the circuit breaker to the ON position. There is probability electric shock if the power is turned on without first conducting these checks.
- If there is any kind of trouble (such as an error display appearing, smell of burning, abnormal sounds, the air conditioner fails to cool or heat or water is leaking) has occurred in the air conditioner, do not touch the air conditioner yourself but set the circuit breaker to the OFF position, and contact a qualified service person. Take steps to ensure that the power will not be turned on (by marking "out of service" near the circuit breaker, for instance) until qualified service person arrives. Continuing to use the air conditioner in this status may cause mechanical problems to escalate or result in electric shocks or other trouble.
- After the work has finished, use an insulation tester set (500V Megger) to check the resistance is 1M ohm or more between the charge section and the non-charge metal section (Earth section). If the resistance value is low, a disaster such as a leak or electric shock is caused at user's side.
- Upon completion of the installation work, check for refrigerant leaks and check the insulation resistance and water drainage. Then conduct a test run to check that the air conditioner is operating properly.

### Explanations given to user

- Upon completion of the installation work, tell the user where the circuit breaker is located. If the user does not know where the circuit breaker is, he or she will not be able to turn it off in the event that trouble occurs in the air conditioner.
- After the installation work, follow the Owner's manual to explain to the customer how to use and maintain the unit.

### Relocation

- Only qualified installer or qualified service person is allowed to relocate the air conditioner. It is dangerous for the air conditioner to be relocated by an unqualified individual since a fire, electric shocks, injury, water leakage, noise and/or vibration may result.
- When carrying out the pump-down work, shut down the compressor before disconnecting the refrigerant pipe. Disconnecting the refrigerant pipe with the service valve left open and the compressor still operating will cause air or other gas to be sucked in, raising the pressure inside the refrigeration cycle to an abnormally high level, and possibly resulting in rupture, injury or other issues.

## CAUTION

### New Refrigerant Air Conditioner Installation

#### ■ THIS AIR CONDITIONER ADOPTS THE NEW HFC REFRIGERANT (R410A) WHICH DOES NOT DESTROY OZONE LAYER.

The characteristics of R410A refrigerant are; easy to absorb water, oxidizing membrane or oil, and its pressure is approx. 1.6 times higher than that of refrigerant R22. Accompanied with the new refrigerant, refrigerating oil has also been changed. Therefore, during installation work, be sure that water, dust, former refrigerant, or refrigerating oil does not enter the refrigerating cycle.

To prevent charging an incorrect refrigerant and refrigerating oil, the sizes of connecting sections of charging port of the main unit and installation tools are changed from those of conventional refrigerant.

Accordingly the exclusive tools are required for the new refrigerant (R410A).

For connecting pipes, use new and clean piping designed for R410A, and please take care so that water or dust does not enter the system. Moreover, do not use the existing piping because there are problems with the pressure-resistance force and impurity in it.

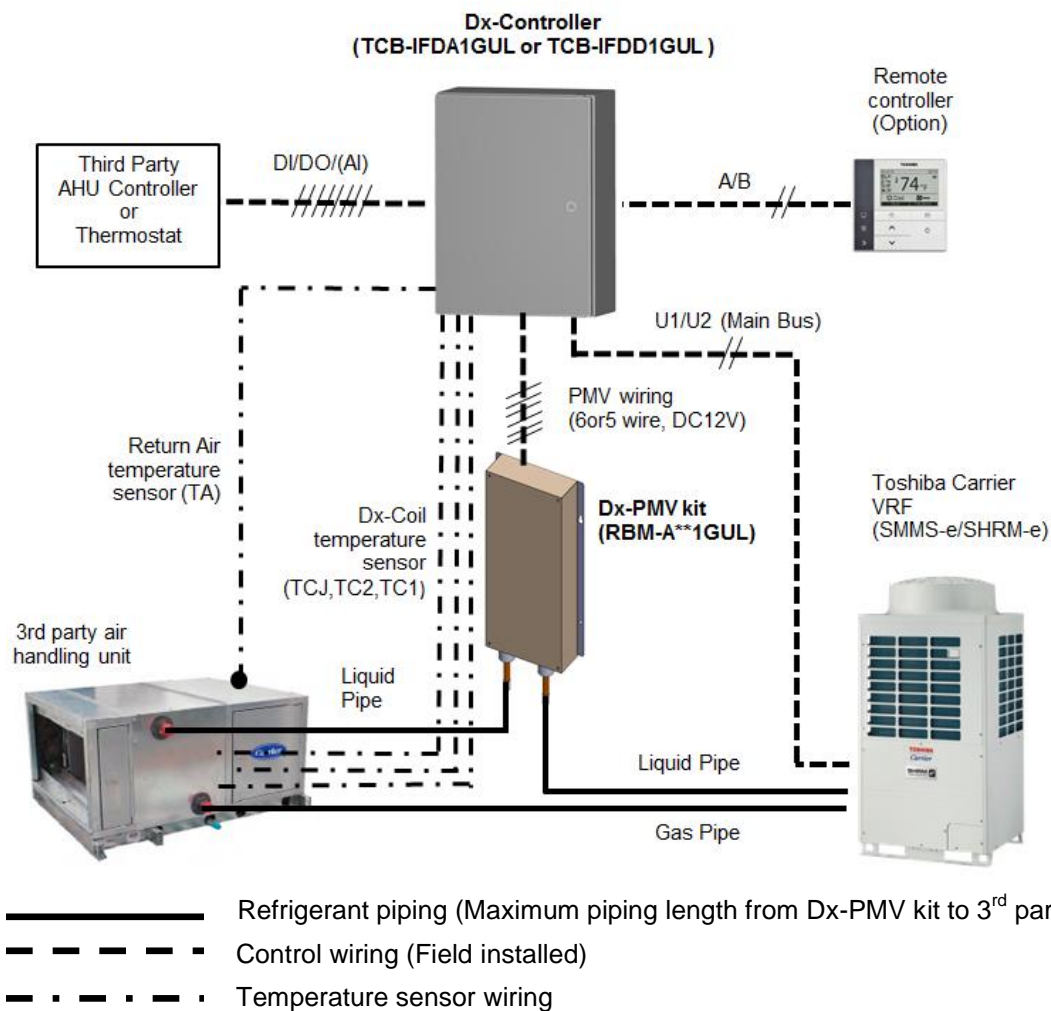
## 2 OVERVIEW: Dx-Interface / Dx-PMV kit

The Dx-Interface system enables third party coil connection to Toshiba Carrier VRF outdoor units.

The Dx-PMV kit is installed as the external expansion valve between VRF refrigerant piping and 3<sup>rd</sup> party Dx-coil.

VRF systems require an appropriately sized Dx-PMV kit which must be brazed to the Dx-Coil used in conjunction with the Dx-Controller (RA control type or 0-10V type).

### Installation Scene



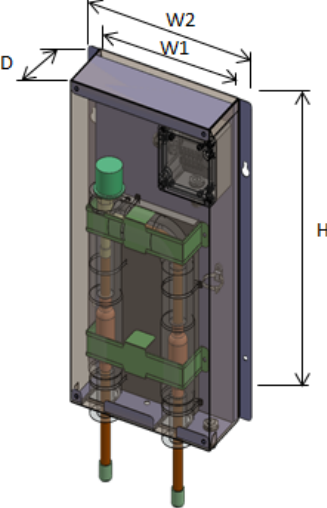






### ■ SPECIFICATION

Model name	RBM-A	0121UL	0301GUL					0601GUL				0961GUL		1921GUL	
Capacity	Code	012	015	018	021	024	030	036	042	048	060	072	096	168	192
	Ton	1	1.25	1.5	1.75	2	2.5	3	3.5	4	5	6	8	14	16
Maximum capacity	kBtu/h	12	15.4	18	21	24	30	36	42	48	60	72	96	168	192
Power supply requirements	Powered by Dx-Controller [12VDC]														
For use with	Dx-Controller (TCB-IFDA1GUL / TCB-IFDD1GUL)														
Ambient operating temp. range (*1)	22 to 115F														
Ambient operating humidity range(*1)	10 to 90% (Non-Condensing)														
Communication cable	AWG20 or 22 X 6 wires (5 wires in case of RBM-1681GUL)														
Piping connections	in.	1/4" X 1/4"			3/8" X 3/8"						1/2"X1/2"			5/8"X5/8"	

(\*1) Install in the place avoiding direct sunlight and rain

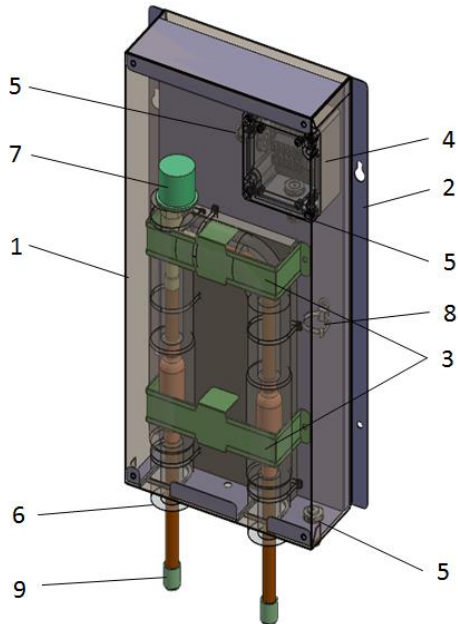
### 3 SUPPLIED PARTS

•The **Dx-PMV kit** is expansion valve box which the installer needs to connect by brazing. There are 5 models which can be configured in to 14 sizes.

Item	Description	Qty	Item	Description	Qty
	Dx-PMV kit	1		Sensor Holder (Ø6mm) (TCJ / TC2)	2
				Sensor Fix Plate (Ø6mm)	2
				Sensor Holder (Ø4mm) (TC1)	1
				Fix Plate (Ø4mm)	1
				Reducer pipe (3/8" - 1/4") (RBM-A0301GUL only)	2
				Installation Manual	1

Model Name	Weight (lbs)		Dimension (inch)			
	Net	Gross	W1	W2	H	D
RBM-A0121GUL / RBM-A0301GUL RBM-A0601GUL / RBM-A0961GUL RBM-A1921GUL	6.0	6.5	8.4	9.8	15.7	3.2

### 4 PART DESCRIPTION

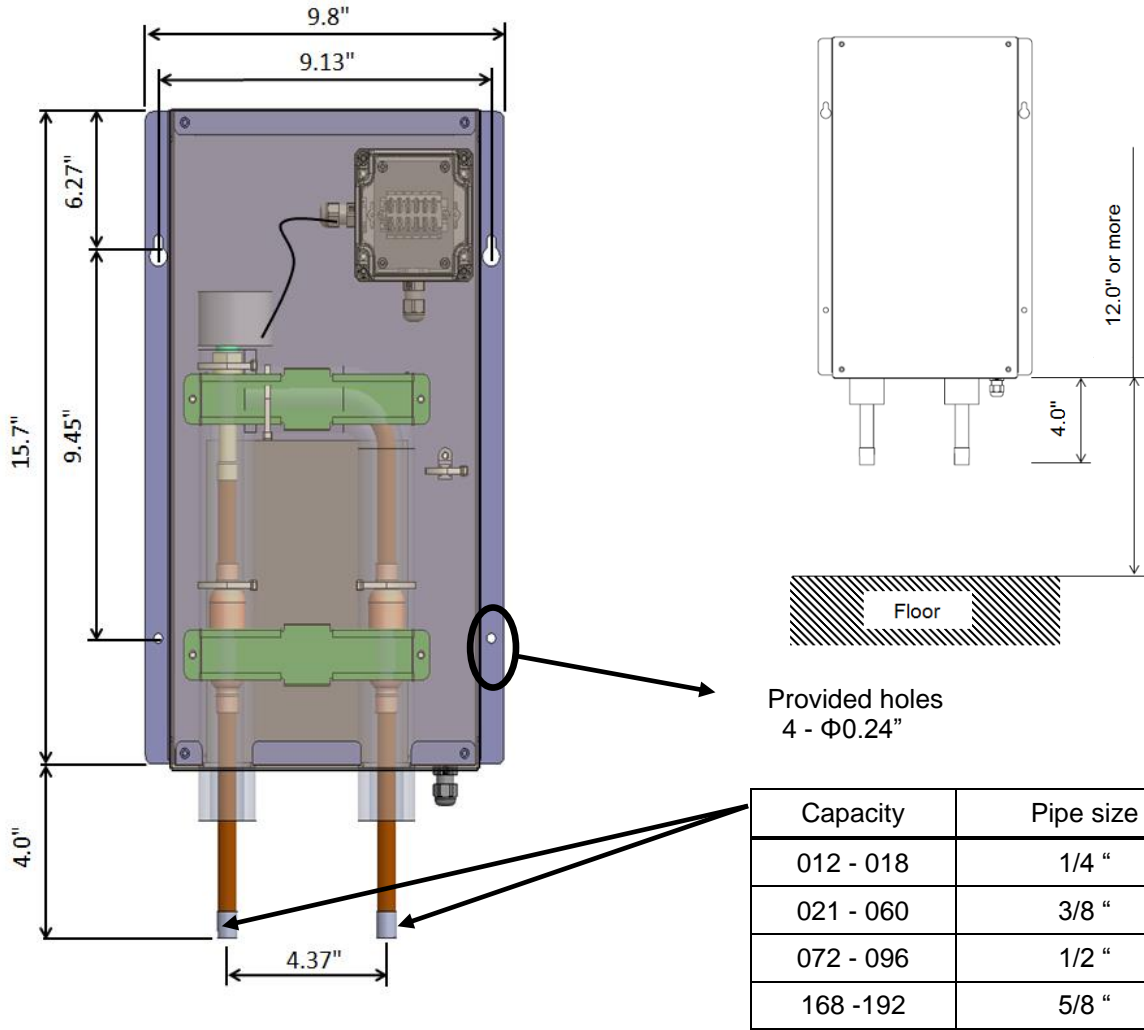


No	Parts name	Quantity
1	Cover box	1
2	Base box	1
3	Bracket	1
4	Terminal box	1
5	Cable Gland	3
6	Insulator tube	1
7	PMV Assembly (PMV, Strainer, Pipe)	1
8	Support tie wrap	1
9	Pipe cap	2

# 5 INSTALLATION

## 1. Box Installation

- Remove the Dx-PMV kit cover box by unscrewing the four screws.
- Drill 4 holes on correct position and fix the Dx-PMV kit securely with 4 screws (Field supply) through the provided holes 0.24" diameter. (Reference the length of the holes  $\Phi 0.24"$ .)
- Be sure to install in vertical orientation so that PMV can work properly.



## 2. Piping Installation

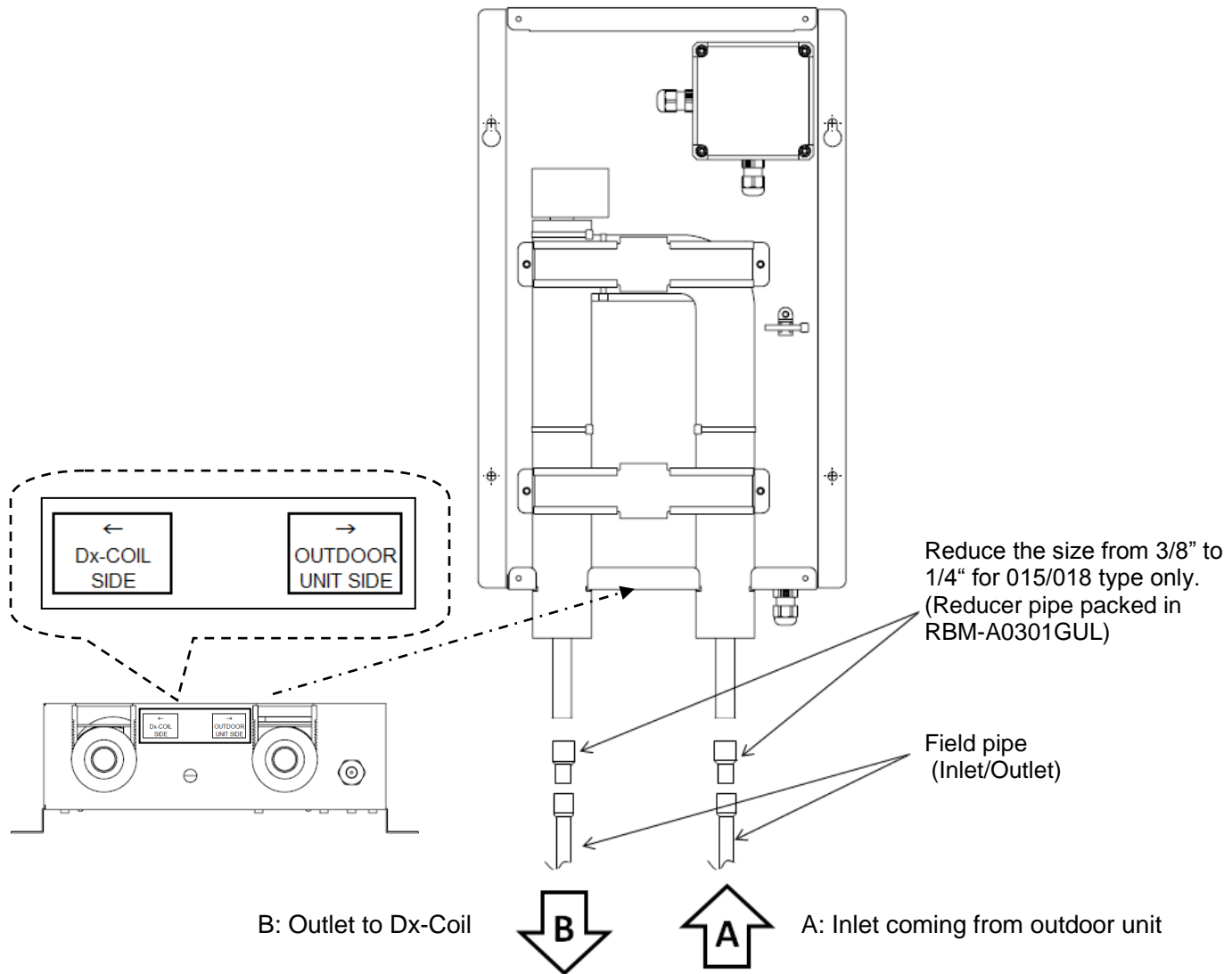
### ■ Preparation

- Remove the pipe cap.
- Prepare the inlet/outlet field piping just in front of the connection. (Do not braze yet.)
- If connecting capacity is 015 or 018 type using RBM-A301GUL, be sure to use the reducer pipe for both brazing. (Connecting pipe size is 1/4" for 015 and 018 type).

Model name	RBM-A	0121UL	0301GUL					0601GUL				0961GUL		1921GUL	
Capacity	Code	12	15	18	21	24	30	36	42	48	60	72	96	168	192
	Ton	1	1.25	1.5	1.75	2	2.5	3	3.5	4	5	6	8	14	16
Piping connections in.		1/4" X 1/4"			3/8" X 3/8"						1/2" X 1/2"		5/8" X 5/8"		

## ■ Brazing work

Dx-PMV kit should be connected in liquid pipe line between outdoor unit and 3<sup>rd</sup> party coil. Be sure to check if direction of piping connection is correct. On the bottom on base box, there is the label which indicates the direction of inlet coming from outdoor unit and outlet to Dx-Coil.



## NOTES

Cautions when brazing of piping on Dx-PMV kit

- A) Whilst brazing, the PMV body and PMV head must be cooled to keep the component's temperature below 212°F.
- B) Whilst brazing, nitrogen gas must be flowed through the PMV valve and pipework to prevent internal oxidization.
- C) Prevent cooling water from getting inside the PMV valve and connector of the lead during brazing.
- D) Take care not to damage the PMV cables during brazing.
- E) The leakage test is executed by pressurizing nitrogen gas up to 601 psi (4.15MPa).

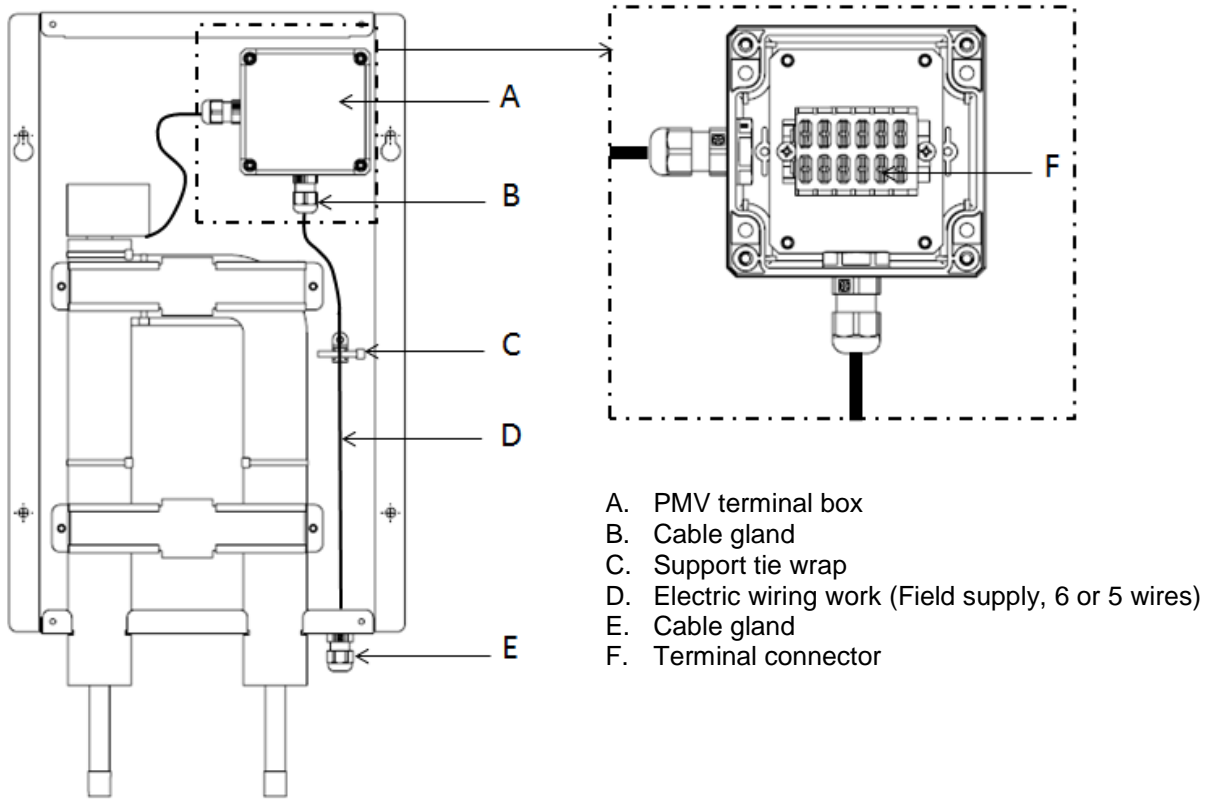
The test must be done with the service valve of the outdoor unit closed and the gas must be pressurized at the liquid pipe, gas pipe (suction gas, discharge gas) of the outdoor unit, and the pressure of the nitrogen gas must not drop for 24 hours.

(For more details, refer to the manual of the outdoor unit.)



### 3. Electrical installation

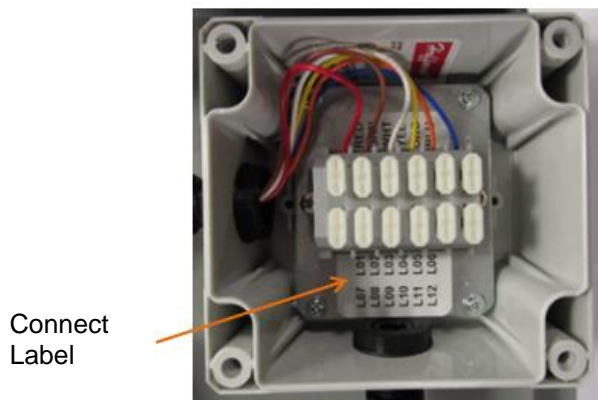
- Open the cover box.
- Pass PMV cable (Field supply, 6 wires) from Dx-controller through cable gland and connect the cable wires into the terminal box following instructions as describe in the following. Route the cable out of the Dx-PMV kit box according to figure below and fix with the support tie wrap.



#### PMV (Pulse motor wiring)

PMV wiring.	Wire size : AWG20 to 22	RBM-A0121/0301/0601/0961GUL : 6 wiring RBM-A1681GUL : 5 wiring
-------------	-------------------------	---

- Use the screwdriver (-) and follow indicated instructions for connecting cable wires into the terminal connector according to the circuit diagram.



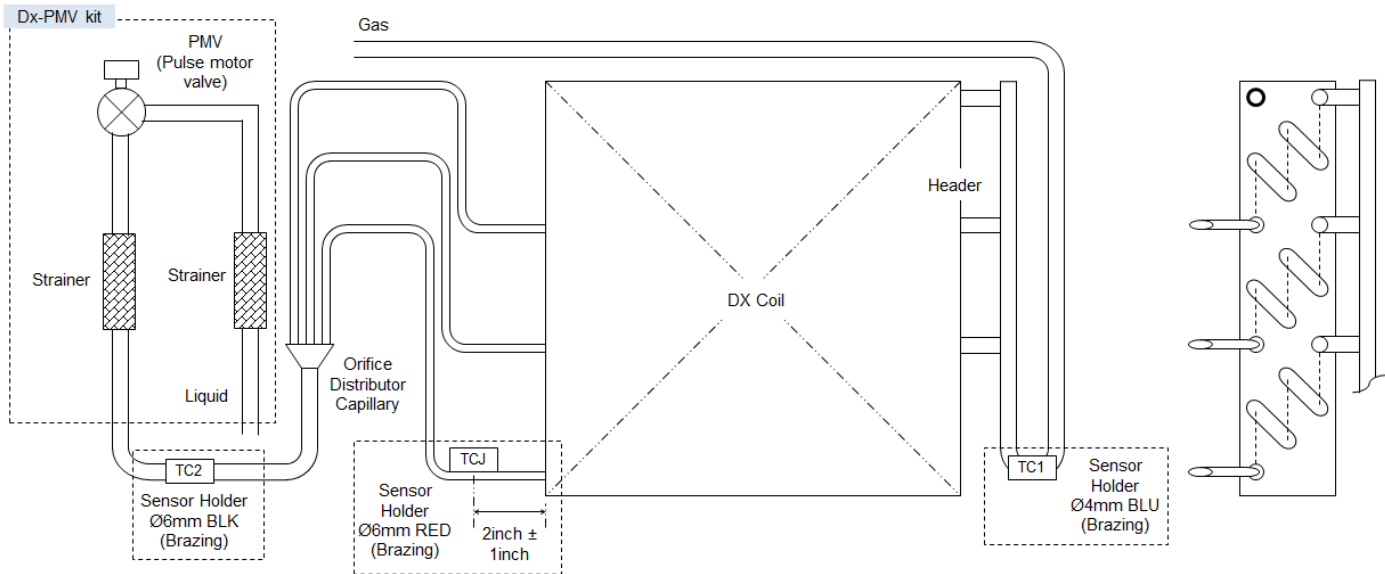
Terminal number		Colour	RBM-A0121GUL A0301GUL A0601GUL A0961GUL	RBM-A1921GUL
PMV1	PMV2			
L01	L07	RED	✓	✓
L02	L08	BRN	✓	
L03	L09	WHI	✓	✓
L04	L10	YEL	✓	✓
L05	L11	ORG	✓	✓
L06	L12	BLU	✓	✓

- Make sure that field wiring and insulation is not pinched when closing the Dx-PMV kit cover box.
- Close the Dx-PMV kit cover box by 4 screw.

## 4. Pipe temperature sensor installation

- Dx-PMV kit is connected to 3<sup>rd</sup> party Dx-Coil as following figure.
- A correct installation of temperature sensor (TC1, TC2, TCJ) is required to ensure a good operation.
- Maximum piping length between Dx-PMV kit to 3<sup>rd</sup> party coil is 16ft.

### ■ Dx-Coil Schematic



### ■ Location of temperature sensor and sensor holder installation

Sensor holders MUST be brazed on to the Dx-Coil pipe work to ensure reliable temperature sensing.

There are three coil sensors, these are inserted into the sensor holders, and secured with the sensor fix plate.

( Note : Temperature sensor is packed in Dx-Controller (TCB-IFDA1GUL / TCB-IFDD1GUL) )

#### TC1 : Ø4mm (Sleeve colour : Blue)

- : Install the temperature sensor at the outlet of the heat exchanger as close as possible to the heat exchanger.

#### TC2 : Ø6mm (Sleeve colour : Black)

- : Install the temperature sensor between the distributor and PMV.

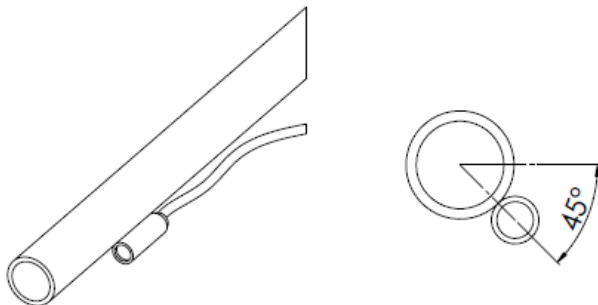
#### TCJ : Ø6mm (Sleeve colour : Red)

- : Install the temperature sensor behind of the distributor on the lowest circuit of the heat exchanger

Pipe size of gas and liquid side is shown the table below.

To ensure the appropriate temperature detection, sensor holders should be brazed as follows.

Capacity		Pipe size	
Code	Ton	Gas	Liquid
012	1	3/8"	1/4 "
015	1.25	1/2 "	1/4 "
018	1.5		
021	1.75		
024	2		
030	2.5		
036	3	5/8"	3/8"
042	3.5		
048	4		
060	5		
072	6		
096	8	7/8"	1/2"
168	14		
192	16		
		1 -1/8"	5/8"



It is essential that the sensors are correctly located to ensure efficient system performance.  
 The 3<sup>rd</sup> Party Dx-Coil should be supplied with a Gas Header and Liquid Capillary Distributor (see below).

**TCJ Sensor Ø6**  
(Large Sensor Holder).

This should be brazed to the capillary on the lowest circuit (2inch ± 1inch from end plate).

**TC2 Sensor Ø6**  
(Large Sensor Holder).

This should be brazed to the pipe between PMV and distributor.

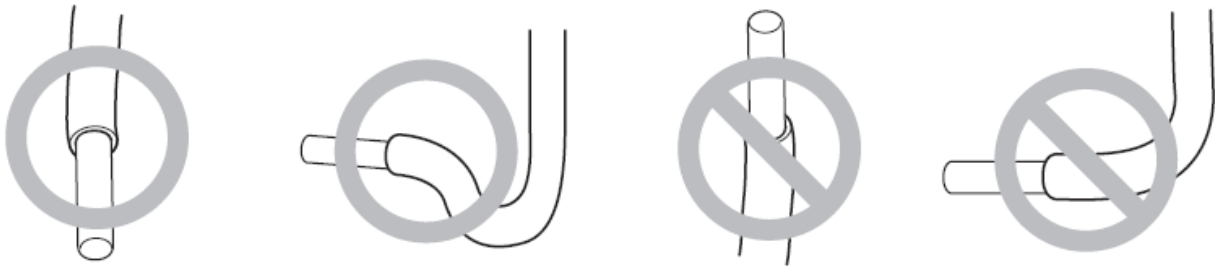
**TC1 Sensor Ø4**  
(Small Sensor Holder).  
Gas Header Pipe.

Avoid positioning Sensor holders in the Drain Pan where they could be immersed in water.

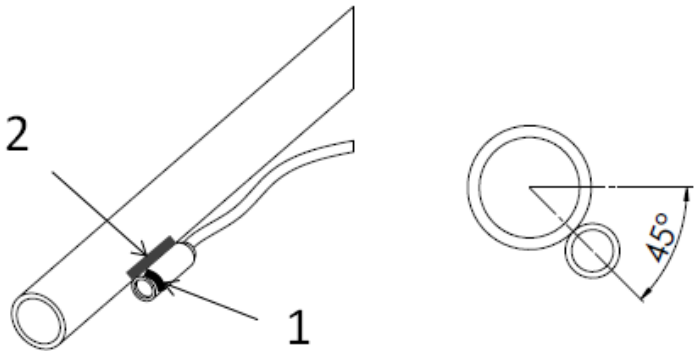
Installer must procure the extension field wire compliant to NFPA/NEC for local cables to connect temperature sensor and to connect the terminal block as necessary.

**CAUTION**

•Install the temperature sensor wire in an orientation such that gravity will not cause moisture to accumulate on the sensor or penetrate the conductor insulation.



•Make a good connection between temperature sensor and Dx-coil. Put the top of the thermistors on the Dx-Coil, this is the most sensitive point of the sensor.



1. Most sensitive part of the sensor
2. Maximize the contact with pipe

Carrier Corporation  
Carrier Ductless and VRF  
Atlanta, Georgia, United States