

# SERVICE MANUAL

## R410A

Outdoor unit

[model names]

PUAZ-P100VHA2

PUAZ-P125VHA2

PUAZ-P140VHA2

PUAZ-P100VHA3

PUAZ-P125VHA3

PUAZ-P140VHA3

[Service Ref.]

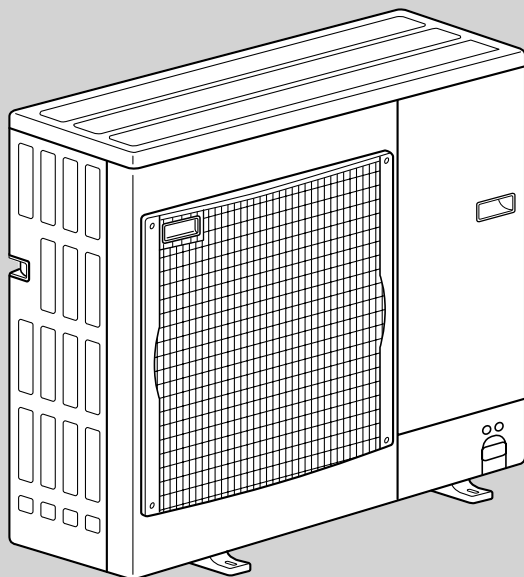
**PUAZ-P100VHA2.UK**
**PUAZ-P125VHA2.UK**
**PUAZ-P125VHA2<sub>1</sub>.UK**
**PUAZ-P140VHA2.UK**
**PUAZ-P140VHA2<sub>1</sub>.UK**
**PUAZ-P100VHA3.UK**
**PUAZ-P100VHA3R1.UK**
**PUAZ-P125VHA3.UK**
**PUAZ-P125VHA3R1.UK**
**PUAZ-P140VHA3.UK**
**PUAZ-P140VHA3R1.UK**
**Revision:**

- PUAZ-P100/125/140 VHA3R1.UK are added in REVISED EDITION-C.
- Some descriptions have been modified.

- Please void OCH415 REVISED EDITION-B.

**Note:**

- RoHS compliant products have <G> mark on the spec name plate.


 PUAZ-P100VHA2.UK  
 PUAZ-P100VHA3.UK

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**PARTS CATALOG (OCB415)**

**1****TECHNICAL CHANGES**

PUHZ-P100VHA3.UK → PUHZ-P100VHA3R1.UK  
 PUHZ-P125VHA3.UK → PUHZ-P125VHA3R1.UK  
 PUHZ-P140VHA3.UK → PUHZ-P140VHA3R1.UK

- Fan grille has been changed.
- Structural parts have been changed. (Munsell 5Y 7/1 → 3Y 7.8/1.1)

PUHZ-P100VHA2.UK → PUHZ-P100VHA3.UK  
 PUHZ-P125VHA2<sub>1</sub>.UK → PUHZ-P125VHA3.UK  
 PUHZ-P140VHA2<sub>1</sub>.UK → PUHZ-P140VHA3.UK

OUTDOOR CONTROLLER BOARD (C.B) has been changed.  
 (Corresponding to the additional combination between PKA-RP•HAL/KAL, PCA-RP•KA and PEAD-RP•JA(L))

\* In case of UL error, the compressor may be damaged if the unit is restarted by remote controller.  
 To avoid the damage, unit has the system that is not able to be restarted unless the power is turned OFF once.

PUHZ-P125VHA2.UK → PUHZ-P125VHA2<sub>1</sub>.UK  
 PUHZ-P140VHA2.UK → PUHZ-P140VHA2<sub>1</sub>.UK

4-WAY VALVE and COIL (21S4) have been changed.

**2****REFERENCE MANUAL****INDOOR UNIT'S SERVICE MANUAL**

Model name	Service Ref.	Service Manual No.
PLA-RP50/60/71/100/125/140BA PLA-RP140BA2	PLA-RP50/60/71/100/125/140BA(#2).UK PLA-RP50/60/71BA <sub>1</sub> .UK PLA-RP140BA2R1.UK	OCH412 OCB412
PCA-RP50/60/71/100/125/140GA PCA-RP50GA2	PCA-RP50/60/71/100/125/140GA(#1) PCA-RP50GA2(#1)	OC328
PCA-RP71/125HA	PCA-RP71/125HA(#1)	OC329
PKA-RP50GAL	PKA-RP50GAL(#1)	OC330
PKA-RP60/71/100FAL PKA-RP50FAL2	PKA-RP60/71/100FAL(#1) PKA-RP50FAL2(#1)	OC331
PEAD-RP50/60/71/125/140EA PEAD-RP100EA2	PEAD-RP50/60/71/125/140EA(#1).UK PEAD-RP100EA2(#1).UK	HWE0521
PEAD-RP60/71/100GA	PEAD-RP60/71/100GA(#1).UK	HWE0506
PKA-RP60/71/100KAL	PKA-RP60/71/100KAL.TH	OCH452 OCB452
PKA-RP35/50HAL	PKA-RP35/50HAL	OCH453 OCB453
PCA-RP50/60/71/100/125/140KA	PCA-RP50/60/71/100/125/140KA	OCH454 OCB454
PEAD-RP35/50/60/71/100/125/140JA(L)	PEAD-RP35/50/60/71/100/125/140JA(L).UK	HWE08130 BWE08240

### 3-1. CAUTIONS RELATED TO NEW REFRIGERANT

#### Cautions for units utilizing refrigerant R410A

##### Use new refrigerant pipes.

In case of using the existing pipes for R22, be careful with the followings.

- Be sure to clean the pipes and make sure that the insides of the pipes are clean.
- Change flare nut to the one provided with this product. Use a newly flared pipe.
- Avoid using thin pipes.

**Make sure that the inside and outside of refrigerant piping is clean and it has no contamination such as sulfur hazardous for use, oxides, dirt, shaving particles, etc. In addition, use pipes with specified thickness.**

Contamination inside refrigerant piping can cause deterioration of refrigerant oil etc.

**Store the piping to be used indoors during installation and both ends of the piping sealed until just before brazing. (Leave elbow joints, etc. in their packaging.)**

If dirt, dust or moisture enters into refrigerant cycle, that can cause deterioration of refrigerant oil or malfunction of compressor.

**Use ester oil, ether oil or alkylbenzene oil (small amount) as the refrigerant oil applied to flares and flange connections.**

If large amount of mineral oil enters, that can cause deterioration of refrigerant oil etc.

**Charge refrigerant from liquid phase of gas cylinder.**

If the refrigerant is charged from gas phase, composition change may occur in refrigerant and the efficiency will be lowered.

**Do not use refrigerant other than R410A.**

If other refrigerant (R22 etc.) is used, chlorine in refrigerant can cause deterioration of refrigerant oil etc.

**Use a vacuum pump with a reverse flow check valve.**

Vacuum pump oil may flow back into refrigerant cycle and that can cause deterioration of refrigerant oil etc.

**Use the following tools specifically designed for use with R410A refrigerant.**

The following tools are necessary to use R410A refrigerant.

Tools for R410A	
Gauge manifold	Flare tool
Charge hose	Size adjustment gauge
Gas leak detector	Vacuum pump adaptor
Torque wrench	Electronic refrigerant charging scale

**Handle tools with care.**

If dirt, dust or moisture enters into refrigerant cycle, that can cause deterioration of refrigerant oil or malfunction of compressor.

**Do not use a charging cylinder.**

If a charging cylinder is used, the composition of refrigerant will change and the efficiency will be lowered.

**Ventilate the room if refrigerant leaks during operation. If refrigerant comes into contact with a flame, poisonous gases will be released.**

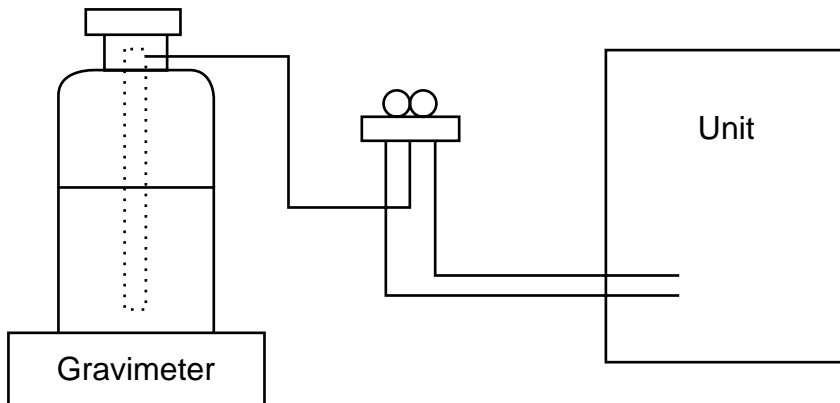
#### [1] Cautions for service

- (1) Perform service after recovering the refrigerant left in unit completely.
- (2) Do not release refrigerant in the air.
- (3) After completing service, charge the cycle with specified amount of refrigerant.
- (4) When performing service, install a filter drier simultaneously.  
Be sure to use a filter drier for new refrigerant.

#### [2] Additional refrigerant charge

##### When charging directly from cylinder

- Check that cylinder for R410A on the market is syphon type.
- Charging should be performed with the cylinder of syphon stood vertically. (Refrigerant is charged from liquid phase.)



### [3] Service tools

Use the below service tools as exclusive tools for R410A refrigerant.

No.	Tool name	Specifications
①	Gauge manifold	· Only for R410A
		· Use the existing fitting specifications. (UNF1/2)
		· Use high-tension side pressure of 5.3MPa-G or over.
②	Charge hose	· Only for R410A
		· Use pressure performance of 5.09MPa-G or over.
③	Electronic scale	——
④	Gas leak detector	· Use the detector for R134a, R407C or R410A.
⑤	Adaptor for reverse flow check	· Attach on vacuum pump.
⑥	Refrigerant charge base	——
⑦	Refrigerant cylinder	· Only for R410A · Top of cylinder (Pink)
		· Cylinder with syphon
⑧	Refrigerant recovery equipment	——

### Cautions for refrigerant piping work

New refrigerant R410A is adopted for replacement inverter series. Although the refrigerant piping work for R410A is same as for R22, exclusive tools are necessary so as not to mix with different kind of refrigerant. Furthermore, as the working pressure of R410A is 1.6 time higher than that of R22, their sizes of flared sections and flare nuts are different.

#### ① Thickness of pipes

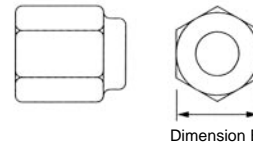
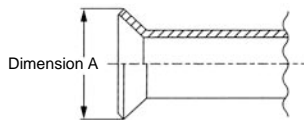
Because the working pressure of R410A is higher compared to R22, be sure to use refrigerant piping with thickness shown below. (Never use pipes of 0.7mm or below.)

Diagram below: Piping diameter and thickness

Nominal dimensions(inch)	Outside diameter (mm)	Thickness (mm)	
		R410A	R22
1/4	6.35	0.8	0.8
3/8	9.52	0.8	0.8
1/2	12.70	0.8	0.8
5/8	15.88	1.0	1.0
3/4	19.05	—	1.0

#### ② Dimensions of flare cutting and flare nut

The component molecules in HFC refrigerant are smaller compared to conventional refrigerants. In addition to that, R410A is a refrigerant, which has higher risk of leakage because its working pressure is higher than that of other refrigerants. Therefore, to enhance airtightness and intensity, flare cutting dimension of copper pipe for R410A have been specified separately from the dimensions for other refrigerants as shown below. The dimension B of flare nut for R410A also have partly been changed to increase intensity as shown below. Set copper pipe correctly referring to copper pipe flaring dimensions for R410A below. For 1/2 and 5/8 inch, the dimension B changes. Use torque wrench corresponding to each dimension.



Flare cutting dimensions

(mm)

Nominal dimensions(inch)	Outside diameter	Dimension A ( $^{+0}_{-0.4}$ )	
		R410A	R22
1/4	6.35	9.1	9.0
3/8	9.52	13.2	13.0
1/2	12.70	16.6	16.2
5/8	15.88	19.7	19.4
3/4	19.05	—	23.3

Flare nut dimensions

(mm)

Nominal dimensions(inch)	Outside diameter	Dimension B	
		R410A	R22
1/4	6.35	17.0	17.0
3/8	9.52	22.0	22.0
1/2	12.70	26.0	24.0
5/8	15.88	29.0 *	27.0
3/4	19.05	—	36.0

\*36.0mm for indoor unit of RP100, 125 and 140

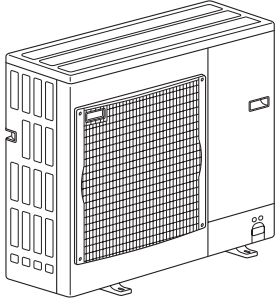
#### ③ Tools for R410A (The following table shows whether conventional tools can be used or not.)

Tools and materials	Use	R410A tools	Can R22 tools be used?	Can R407C tools be used?
Gauge manifold	Air purge, refrigerant charge and	Tool exclusive for R410A	×	×
Charge hose	Operation check	Tool exclusive for R410A	×	×
Gas leak detector	Gas leak check	Tool for HFC refrigerant	×	○
Refrigerant recovery equipment	Refrigerant recovery	Tool exclusive for R410A	×	×
Refrigerant cylinder	Refrigerant charge	Tool exclusive for R410A	×	×
Applied oil	Apply to flared section	Ester oil and alkylbenzene oil (minimum amount)	×	Ester oil: ○ Alkylbenzene oil: minimum amount
Safety charger	Prevent compressor malfunction when charging refrigerant by spraying liquid refrigerant	Tool exclusive for R410A	×	×
Charge valve	Prevent gas from blowing out when detaching charge hose	Tool exclusive for R410A	×	×
Vacuum pump	Vacuum drying and air purge	Tools for other refrigerants can be used if equipped with adopter for reverse flow check	△ (Usable if equipped with adopter for reverse flow)	△ (Usable if equipped with adopter for reverse flow)
Flare tool	Flaring work of piping	Tools for other refrigerants can be used by adjusting flaring dimension	△ (Usable by adjusting flaring dimension)	△ (Usable by adjusting flaring dimension)
Bender	Bend the pipes	Tools for other refrigerants can be used	○	○
Pipe cutter	Cut the pipes	Tools for other refrigerants can be used	○	○
Welder and nitrogen gas cylinder	Weld the pipes	Tools for other refrigerants can be used	○	○
Refrigerant charging scale	Refrigerant charge	Tools for other refrigerants can be used	○	○
Vacuum gauge or thermistor vacuum gauge and vacuum valve	Check the degree of vacuum. (Vacuum valve prevents back flow of oil and refrigerant to thermistor vacuum gauge)	Tools for other refrigerants can be used	○	○
Charging cylinder	Refrigerant charge	Tool exclusive for R410A	×	—

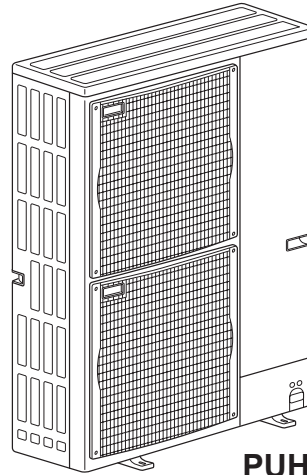
× : Prepare a new tool. (Use the new tool as the tool exclusive for R410A.)

△ : Tools for other refrigerants can be used under certain conditions.

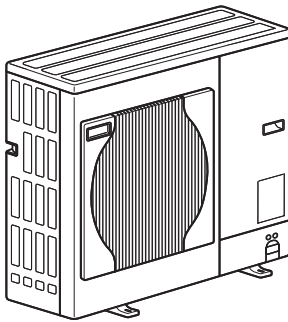
○ : Tools for other refrigerants can be used.



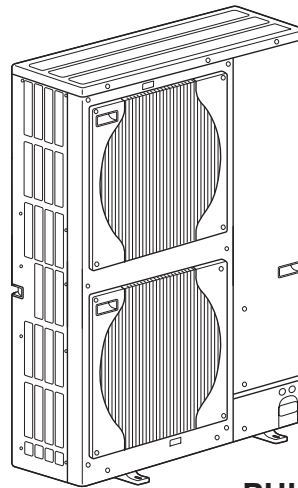
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PUHZ-P100VHA3.UK**



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PUHZ-P140VHA2<sub>1</sub>.UK  
PUHZ-P125VHA3.UK  
PUHZ-P140VHA3.UK**



**PUHZ-P100VHA3R1.UK (X 1)**



**PUHZ-P125VHA3R1.UK  
PUHZ-P140VHA3R1.UK (X 3)**

#### **CHARGELESS SYSTEM**

**PRE-CHARGED REFRIGERANT IS SUPPLIED FOR PIPING LENGTH AT SHIPMENT.**

**(Max.30m (PUHZ-P125/P140))**

The refrigerant circuit with LEV (Linear Expansion Valve) and Accumulator always control the optimal refrigerant level regardless of the length (30m max. and 5m min.) of piping. The additional refrigerant charging work during installation often causes problems. Heretofore it is completely eliminated. This unique system improves the quality and reliability of the work done. It also helps to speed up the installation time.

# 5

# SPECIFICATIONS

Service Ref.				PUHZ-P100VHA2.UK PUHZ-P100VHA3.UK PUHZ-P100VHA3R1.UK				
Mode				Cooling		Heating		
OUTDOOR UNIT	Power supply (phase, cycle, voltage)			Single, 50Hz, 230V				
	Running current		A	12.26		12.62		
	Max. current		A	28				
	External finish				Munsell 5Y 7/1 / Munsell 3Y 7.8/1.1 (VHA3R1)			
	Refrigerant control				Linear Expansion Valve			
	Compressor				Hermetic			
	Model			TNB220FLHMT				
	Motor output		kW	2.9				
	Starter type				Inverter			
	Protection devices				HP switch Discharge thermo			
	Crankcase heater			W				
	Heat exchanger				Plate fin coil			
	Fan			Propeller fan × 1				
	Fan(drive) × No.				0.060			
	Fan motor output		kW	60(2120)				
	Airflow		m³/min(CFM)	Reverse cycle				
	Defrost method				Reverse cycle			
	Noise level		Cooling	dB		50		
			Heating	dB		54		
	Dimensions			W	mm(in.)		950(37-3/8)	
			D	mm(in.)		330+30(13+1-3/16)		
			H	mm(in.)		943(37-1/8)		
Weight					kg(lbs)		75(165)	
Refrigerant				R410A				
Charge		kg(lbs)		3.0(6.6)				
Oil (Model)		L		0.87(FV50S)				
REFRIGERANT PIPING	Pipe size O.D.		Liquid	mm(in.)		9.52(3/8)		
			Gas	mm(in.)		15.88(5/8)		
	Connection method			Indoor side		Flared		
				Outdoor side		Flared		
	Between the indoor & outdoor unit			Height difference		Max. 30m		
			Piping length		Max. 50m			

Service Ref.				PUHZ-P125VHA2.UK PUHZ-P125VHA2.1.UK PUHZ-P125VHA3.UK PUHZ-P125VHA3R1.UK				PUHZ-P140VHA2.UK PUHZ-P140VHA2.1.UK PUHZ-P140VHA3.UK PUHZ-P140VHA3R1.UK					
Mode				Cooling		Heating		Cooling		Heating			
OUTDOOR UNIT	Power supply (phase, cycle, voltage)			Single 50Hz, 230V									
	Running current		A	17.37		28		16.74		22.48		21.31	
	Max. current		A	28									
	External finish				Munsell 5Y 7/1 / Munsell 3Y 7.8/1.1 (VHA3R1)								
	Refrigerant control				Linear Expansion Valve								
	Compressor				Hermetic								
	Model			TNB306FPGM									
	Motor output		kW	3.4				3.9					
	Starter type				Inverter								
	Protection devices				HP switch Discharge thermo								
	Crankcase heater			W									
	Heat exchanger				Plate fin coil								
	Fan			Propeller fan × 2									
	Fan(drive) × No.				0.060+0.060								
	Fan motor output		kW	100(3,530)									
	Airflow		m³/min(CFM)	Reverse cycle									
	Defrost method				Reverse cycle								
	Noise level		Cooling	dB		51				52			
			Heating	dB		55				56			
	Dimensions			W	mm(in.)		950(37-3/8)						
			D	mm(in.)		330+30(13+1-3/16)							
			H	mm(in.)		1,350(53-1/8)							
Weight					kg(lbs)							99(218)	
Refrigerant				R410A									
Charge		kg(lbs)		4.5(9.9)									
Oil (Model)		L		0.87(FV50S)									
REFRIGERANT PIPING	Pipe size O.D.		Liquid	mm(in.)		9.52(3/8)							
			Gas	mm(in.)		15.88(5/8)							
	Connection method			Indoor side		Flared							
				Outdoor side		Flared							
	Between the indoor & outdoor unit			Height difference		Max. 30m							
			Piping length		Max. 50m								