

# INSTALLATION & OPERATION MANUAL

**YUTAKI M R32 series**  
**YUTAKI HYDROSPLIT R32 series**



## MODELS

RASM-(2/3)VRE  
RASM-(4-7)(V)R1E  
RASM-(4-7)(V)RW1E  
HWM-WE  
HWD-WE-220S(-K)



Cooling & Heating

air

## EN

The English version is the original one; other languages are translated from English. Should any discrepancy occur between the English and the translated versions, the English version shall prevail.

## ES

La versión en inglés es la original, y las versiones en otros idiomas son traducciones de la inglesa. En caso de discrepancias entre la versión inglesa y las versiones traducidas, prevalecerá la versión inglesa.

## DE

Die englische Fassung ist das Original, und die Fassungen in anderen Sprachen werden aus dem Englischen übersetzt. Sollten die englische und die übersetzten Fassungen voneinander abweichen, so hat die englische Fassung Vorrang.

## FR

La version anglaise est la version originale; les autres langues sont traduites de l'anglais. En cas de divergence entre les versions anglaise et traduite, la version anglaise prévaudra.

## IT

La versione inglese è l'originale e le versioni in altre lingue sono traduzioni dall'inglese. In caso di divergenze tra la versione inglese e quelle tradotte, fa fede la versione inglese.

## PT

A versão inglesa é a original; as versões em outras línguas são traduzidas do inglês. Em caso de divergência entre a versão em língua inglesa e as versões traduzidas, faz fé a versão em língua inglesa.

## DA

Den engelske udgave er originalen, og udgaverne på andre sprog er oversat fra engelsk. Hvis der forekommer uoverensstemmelser mellem den engelske og den oversatte sprogudgave, vil den engelske udgave være gældende.

## NL

De Engelse versie is de originele; andere talen zijn vertaald uit het Engels. In geval van verschillen tussen de Engelse versie en de vertaalde versies, heeft de Engelse versie voorrang.

## SV

Den engelska versionen är originalet, och versionerna på andra språk är från engelska översättningar. I händelse av bristande överensstämmelse mellan den engelska och den översatta versionerna, skall den engelska versionen vara giltig.

## EL

Η αγγλική έκδοση είναι το πρωτότυπο και οι εκδόσεις σε άλλες γλώσσες μεταφράζονται από τα αγγλικά. Σε περίπτωση που διαπιστωθούν διαφορές μεταξύ της αγγλικής και της μεταφρασμένης έκδοσης, η αγγλική έκδοση είναι επικρατέστερη.

## BG

Версията на английски език е оригиналната; версията на останалите езици са в превод от английски език. При различие между английската версия и преводна версия на друг език за меродавна се счита английската версия.

## CS

Originální verze tohoto dokumentu je v angličtině; ostatní jazykové varianty jsou z angličtiny přeloženy. Pokud mezi anglickou a jakoukoli jinou jazykovou verzí dojde k rozporu, bude převažovat anglická verze.

## HU

Az eredeti változat az angol; az egyéb nyelvű változatok angolról lettek fordítva. Amennyiben az angol és a fordított verziók között bármilyen eltérés mutatkozik, az angol nyelvű változat a mérvadó.

## LT

Versija anglų kalba yra originali; versijos kitomis kalbomis yra išverstos iš anglų kalbos. Jei yra neatitikimų tarp versijos anglų kalba ir verstinių versijų, pirmenybė teikiama versijai anglų kalba.

## PL

Wersja angielska jest wersją oryginalną - wszystkie pozostałe stanowią jej tłumaczenie na odpowiednie języki. W przypadku stwierdzenia jakichkolwiek rozbieżności między oryginałem a jego tłumaczeniem, rozstrzygająca jest wersja w języku angielskim.

## RO

Versiunea originală este cea în limba engleză; versiunile în alte limbi sunt traduse din limba engleză. Dacă există vreo discrepanță între versiunile în limba engleză și versiunea tradusă, prevalează versiunea în limba engleză.

## SK

Anglická verzia je pôvodná, ďalšie jazyky sú preložené z angličtiny. V prípade akýchkoľvek nezrovnalostí medzi anglickou a preloženou verzou, bude rozhodujúca anglická verzia.

## UK

Англійська версія є оригінальною; інші мови переведені з англійської. У разі виникнення розбіжностей між англійською та перекладеною версіями, англійська версія має переважну силу.

EN	English	Original version
ES	Español	Versión traducida
DE	Deutsch	Übersetzte Version
FR	Français	Version traduite
IT	Italiano	Versione tradotta
PT	Português	Versão traduzida
DA	Dansk	Oversat version
NL	Nederlands	Vertaalde versie
SV	Svenska	Översatt version
EL	Ελληνικά	Μεταφρασμένη έκδοση
BG	Български	Преведена версия
CS	Čeština	Přeložená verze
HU	Magyar	Lefordított változat
LT	Lietuvių	Versta versija
PL	Polski	Tłumaczenie wersji oryginalnej
RO	Română	Versiune tradusă
SK	Slovenčina	Preložená verzia
UK	Українська	Перекладена версія



## Contents

<b>01</b>	General Information.....	11
<b>02</b>	Name of parts and dimensional data.....	19
<b>03</b>	Electrical data.....	26
<b>04</b>	Working range .....	31
<b>05</b>	Drain and water piping.....	41
<b>06</b>	Electrical and control settings.....	64
<b>07</b>	Commissioning.....	97
<b>08</b>	Maintenance.....	104

## General Index

1. General Information .....	11
1.1 General information.....	12
1.2 Applied Symbols.....	12
1.3 Product guide.....	14
1.3.1 Classification of the units.....	14
1.3.1.1 Monobloc system .....	14
1.3.1.2 Hydrosplit system - Outdoor unit.....	14
1.3.1.3 Hydrosplit system - Indoor unit.....	15
1.4 Product list.....	16
1.4.1 Monobloc system.....	16
1.4.2 Hydrosplit system R32 .....	17
1.4.3 Hydrosplit system - Indoor unit .....	17
1.4.4 Unit Controller Accessory.....	18
2. Name of parts and dimensional data .....	19
2.1 YUTAKI M R32 .....	20
2.1.1 RASM-(2/3)VRE.....	20
2.1.2 RASM-(4-7)(V)R1E .....	21
2.2 YUTAKI Hydrosplit R32 - RASM-(4-7)(V)WR1E .....	22
2.3 YUTAKI H - HWM-WE.....	23
2.4 YUTAKI H Combi - HWD-WE-220S.....	24
2.5 YUTAKI H Combi - HWD-WE-220S-K.....	25
3. Electrical data .....	26
3.1 Considerations.....	27

3.1.1	Monobloc system .....	28
3.1.2	Hydrosplit system - Outdoor unit .....	29
3.1.2.1	RAS-(4-7)(V)WR1E in combination with YUTAKI H, YUTAKI H Combi .....	29
3.1.3	Hydrosplit system - Indoor unit .....	29
3.1.3.1	YUTAKI H .....	29
3.1.3.2	YUTAKI H Combi .....	30
4.	Working range.....	<b>31</b>
4.1	Power supply working range.....	32
4.2	Temperature working range.....	32
4.2.1	Space heating .....	33
4.2.2	DHW .....	34
4.2.3	Swimming pool heating .....	35
4.2.4	Space cooling (Necessary cooling kit) .....	35
4.3	R32 Hydraulic working range .....	36
4.3.1	Hydraulic data .....	36
4.3.2	Pump performance curves .....	37
4.3.2.1	YUTAKI M R32 .....	37
4.3.2.2	YUTAKI Hydrosplit R32 + YUTAKI H.....	39
4.3.2.3	YUTAKI Hydrosplit R32 + YUTAKI H Combi .....	40
5.	Drain and water piping.....	<b>41</b>
5.1	Water Drain Discharge Connection (Accessory) .....	43
5.1.1	Connecting procedure .....	43
5.2	Outdoor Unit Draining Operation .....	44
5.3	Indoor Unit Draining Operation.....	44
5.3.1	Draining operation for YUTAKI H.....	44

5.3.2	Draining operation for YUTAKI H Combi.....	45
5.4	YUTAKI Hydraulic Connections.....	46
5.4.1	Hydraulic Connections for YUTAKI M .....	46
5.4.2	Hydraulic Connections for YUTAKI HYDROSPLIT and YUTAKI H.....	46
5.4.3	Hydraulic Connections for YUTAKI HYDROSPLIT and YUTAKI H Combi	47
5.4.4	Parts name list .....	47
5.5	Space heating and DHW for YUTAKI M / YUTAKI Hydrosplit.....	49
5.5.1	Additional hydraulic necessary elements for space heating .....	49
5.5.2	Additional hydraulic necessary elements for DHW .....	50
5.5.3	Additional hydraulic optional elements (For DHW) .....	52
5.5.4	Requirements and recommendations for the hydraulic circuit .....	53
5.5.5	Anti-freezing protection for water circuit .....	54
5.5.6	Glycol as anti-freezing protection.....	54
5.5.7	Insulation.....	56
5.5.8	Water filling .....	56
5.5.9	Water quality .....	58
5.6	Minimum water volume description .....	60
5.7	Water piping .....	62
5.7.1	Water piping length .....	62
5.7.2	Water piping size .....	62
5.8	Suspension of water piping.....	63
6.	Electrical and control settings .....	64
6.1	Optional unit wiring for accessories .....	66
6.1.1	Summary of the terminal board connections.....	66
6.1.2	Input terminals (Default input functions) .....	70
6.2	Setting of DIP switches and RSW switches.....	80

6.2.1 Refrigerant cycle PCB.....	83
6.2.1.1 DSW1 .....	83
6.2.1.2 DSW2.....	84
6.2.1.3 DSW3.....	85
6.2.1.4 DSW4 / RSW1.....	86
6.2.1.5 DSW5.....	86
6.2.1.6 DSW6.....	87
6.2.1.7 DSW7.....	87
6.2.1.8 DSW301 .....	88
6.2.1.9 DSW302 .....	88
6.2.1.10 LED indication.....	89
6.2.2 Water cycle PCB.....	90
6.2.2.1 DSW1.....	90
6.2.2.2 DSW2.....	90
6.2.2.3 DSW3.....	91
6.2.2.4 DSW4.....	91
6.2.2.5 DSW5.....	93
6.2.2.6 DSW6 (only if available).....	93
6.2.2.7 DSW7.....	94
6.2.2.8 DSW15 & RSW2 .....	94
6.2.2.9 DSW16 & RSW1 .....	94
6.2.2.10 DSW18 .....	95
6.2.2.11 SSW1.....	95
6.2.2.12 SSW2.....	95
6.2.2.13 LED indication.....	96
7. Commissioning.....	97



7.1	Before operation.....	98
7.2	Preliminary check.....	98
7.2.1	Checking the unit.....	98
7.2.2	Electrical checking.....	98
7.2.3	Hydraulic circuit checking (space heating and DHW).....	99
7.2.4	Checking the refrigerant circuit.....	99
7.2.5	Test and check.....	100
7.3	Commissioning procedure.....	100
7.4	Test run / air purge.....	101
8.	Maintenance.....	104
8.1	YUTAKI M R32 and YUTAKI Hydrosplit R32.....	105
8.1.1	RASM-(2-3)VRE.....	105
8.1.1.1	Removing the service cover.....	105
8.1.1.2	Removing the upper cover.....	106
8.1.1.3	Removing the front cover.....	107
8.1.1.4	Removing the rear cover.....	107
8.1.2	RASM-(4-7)(V)R(W)1E.....	109
8.1.2.1	Removing the service cover.....	109
8.1.2.2	Removing the upper cover.....	110
8.1.2.3	Removing the rear cover.....	111
8.2	YUTAKI H.....	112
8.2.1	Removing the indoor unit service cover.....	112
8.2.2	Removing indoor unit electrical box.....	113
8.2.3	Space heating pipes connection.....	114
8.2.3.1	Drain pipes connection.....	114
8.2.4	Cover assembly.....	115

8.3	YUTAKI H Combi .....	117
8.3.1	Removing the indoor unit covers .....	117
8.3.2	Removing indoor unit electrical box.....	118
8.3.3	Space heating pipes connection .....	119
8.3.4	DHW pipes connection .....	120
8.3.4.1	Drain pipes connection .....	120

## General Information

1.1	General information .....	12
1.2	Applied Symbols .....	12
1.3	Product guide .....	14
1.3.1	Classification of the units.....	14
1.3.1.1	Monobloc system .....	14
1.3.1.2	Hydrosplit system - Outdoor unit.....	14
1.3.1.3	Hydrosplit system - Indoor unit.....	15
1.4	Product list .....	16
1.4.1	Monobloc system .....	16
1.4.2	Hydrosplit system R32 .....	17
1.4.3	Hydrosplit system - Indoor unit .....	17
1.4.4	Unit Controller Accessory .....	18

## 1.1 General information

No part of this publication may be reproduced, copied, filed or transmitted in any shape or form without the permission of Johnson Controls-Hitachi Air Conditioning Spain, S.A.U.

Within the policy of continuous improvement of its products, Johnson Controls-Hitachi Air Conditioning Spain, S.A.U. reserves the right to make changes at any time without prior notification and without being compelled to introducing them into products previously sold. This document may therefore have been subject to amendments during the life of the product.

HITACHI makes every effort to offer correct, up-to-date documentation. Despite this, printing errors cannot be controlled by HITACHI and are not its responsibility.

As a result, some of the images or data used to illustrate this document may not refer to specific models. No claims will be accepted based on the data, illustrations and descriptions included in this manual.

## 1.2 Applied Symbols

During normal heat pump system design work or unit installation, greater attention must be paid in certain situations requiring particular care in order to avoid damage to the unit, the installation or the building or property.

Situations that pose a risk to the safety of those in the surrounding area or to the unit itself are clearly indicated in this manual.

A series of special symbols are used to clearly identify these situations.

Pay close attention to these symbols and to the messages following them, as your safety and that of others depends on it.



***RISK OF EXPLOSION: This symbol shows that this equipment uses an odourless low burning velocity refrigerant. This appliance is filled with R32. If the refrigerant is leaked, there is a possibility of ignition if it enters in contact with an external ignition source.***

 **DANGER**

- **The text following this symbol contains information and instructions relating directly to your safety, in addition to hazards or unsafe practices which could result in severe personal injuries or death.**
- **Not taking these instructions into account could lead to serious, very serious or even fatal injuries to you and others.**

In the texts following the danger symbol you can also find information on safety procedures during unit installation.

## CAUTION

- *The text following this symbol contains information and instructions relating directly to your safety, in addition to hazards or unsafe practices which could result in minor personal injury or product or property damage.*
- *Not taking these instructions into account could lead to minor injuries to you and others in the proximities of the unit.*
- *Not taking these instructions into account could lead to unit damage.*

In the texts following the caution symbol you can also find information on safety procedures during unit installation.

## NOTE

- *The text following this symbol contains information or instructions that may be of use or that require a more thorough explanation.*
- *Instructions regarding inspections to be made on unit parts or systems may also be included.*

## 1.3 Product guide

### 1.3.1 Classification of the units

#### 1.3.1.1 Monobloc system

##### ◆ YUTAKI M R32 - RASM-(2-7)(V)R(1)E

Unit type: Monobloc system - Single water module (Outdoor unit) - Low/Medium temperature

	Position-separating hyphen (fixed)		Compressor power (HP): 2.0, 3.0, 4.0, 5.0, 6.0, 7.0		V: Single phase unit (~ 230V 50Hz) —: Three phase unit (3N~ 400V 50Hz)	R32 refrigerant	Serie 1	Made in Europe
<b>RASM</b>	<b>-</b>	<b>X.X</b>	<b>(X)</b>	<b>R</b>	<b>(1)</b>	<b>E</b>		

#### 1.3.1.2 Hydrosplit system - Outdoor unit

##### ◆ YUTAKI Hydrosplit R32 - RASM-(4-7)(V)WR1E

Unit type: Hydrosplit system (Outdoor unit) - Low/Medium temperature

	Position-separating hyphen (fixed)		Compressor power (HP): 4.0, 5.0, 6.0, 7.0		V: Single phase unit (~ 230V 50Hz) -: Three phase unit (3N~ 400V 50Hz)	R32 refrigerant	W: Hydrosplit system	1: series	Made in Europe
<b>RASM</b>	<b>-</b>	<b>X.X</b>	<b>(V)</b>	<b>R</b>	<b>W</b>	<b>1</b>	<b>E</b>		

## 1.3.1.3 Hydrosplit system - Indoor unit

### ◆ YUTAKI H - HWM-WE

Unit type: Hydrosplit system - Single water module (Indoor unit) - Medium/Low temperature

Position-separating hyphen (fixed)

W: Water to water

Made in Europe

<b>HWM</b>	-	<b>W</b>	<b>E</b>
------------	---	----------	----------

### ◆ YUTAKI H Combi - HWM-WE-220S(-K)

Unit type: Split system - Dual water module (Indoor unit + Domestic hot water tank) - Medium/Low temperature

Position-separating hyphen (fixed)

Water-to-water DHW heat exchanger

Made in Europe

Position-separating hyphen (fixed)

Tank model: 220 L







Tank material: Stainless steel

-K: Model for UK market

<b>HWD</b>	-	<b>W</b>	<b>E</b>	-	<b>220</b>	<b>S</b>	<b>(-K)</b>
------------	---	----------	----------	---	------------	----------	-------------



## 1.4 Product list

Icons between brackets mean possible extra operations to the factory-supplied operations (additional accessories, field-supplied accessories or systems can be needed)

-  : Heating operation
-  : Cooling operation
-  : Additional heater (electrical heater accessory or boiler)
-  : Domestic Hot Water (DHW)
-  : Swimming pool application
-  : Solar combination

### 1.4.1 Monobloc system

#### ◆ YUTAKI M R32 - RASM-(4-7)(V)R1E

Model	Power supply	Remarks	Picture
RASM-2VRE			
RASM-3VRE			
RASM-4VR1E	~ 230V 50Hz		
RASM-5VR1E		Monobloc air-to-water heat pump system	
RASM-6VR1E			
RASM-4R1E			
RASM-5R1E	3N~ 400V 50Hz		
RASM-6R1E			
RASM-7R1E			

#### NOTE

- The unit controller has to be ordered separately as accessory:
  - » PC-ARFH2E model for YUTAKI RASM-(4-7)(V)R1E.
  - » PC-ARFH1E(01-03) model for YUTAKI RASM-(2-3)VRE.
- For cooling operation, refer to the Cooling kit accessory.



## 1.4.2 Hydrosplit system R32

### ◆ YUTAKI Hydrosplit system - RASM-(4-7)(V)RW1E

Model	Power supply	Remarks	Picture
RASM-4VRW1E	~ 230V 50Hz	Hydrosplit air-to-water heat pump system	
RASM-5VRW1E			
RASM-6VRW1E			
RASM-4RW1E	3N~ 400V 50Hz		
RASM-5RW1E			
RASM-6RW1E			
RASM-7RW1E			

#### NOTE

For cooling operation, refer to the Cooling kit accessory.


## 1.4.3 Hydrosplit system - Indoor unit

### ◆ YUTAKI H

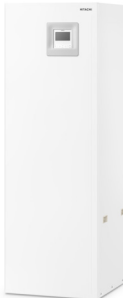
Model	Power supply	Remarks	Picture
HWM-WE	~ 230V 50Hz 3N~ 400V 50Hz	Wall mounted indoor unit for Hydrosplit air-to-water heat pump system	

## ◆ YUTAKI H Combi

### Standard model



Model	Power supply	Remarks	Picture
HWD-WE-220S	~ 230V 50Hz 3N~ 400V 50Hz	Floor standing indoor units with integrated DHW tank for Hydrosplit air-to-water heat pump system	

### Model for UK market

Model	Power supply	Remarks	Picture
HWD-WE-220S-K	~ 230V 50Hz 3N~ 400V 50Hz	Floor standing indoor units with integrated DHW tank (UK version) for Hydrosplit air-to-water heat pump system	

## 1.4.4 Unit Controller Accessory

Unit controller accessory is sold separately for RASM-(2-7)(V)R(1)E units:

Accessory	Name	Picture
PC-ARFH2E	Unit controller Wired room thermostat for YUTAKI RASM-(4-7)(V)R1E	
PC-ARFH1E(01-03)	Unit controller Wired room thermostat for YUTAKI RASM-(2-3)VRE	

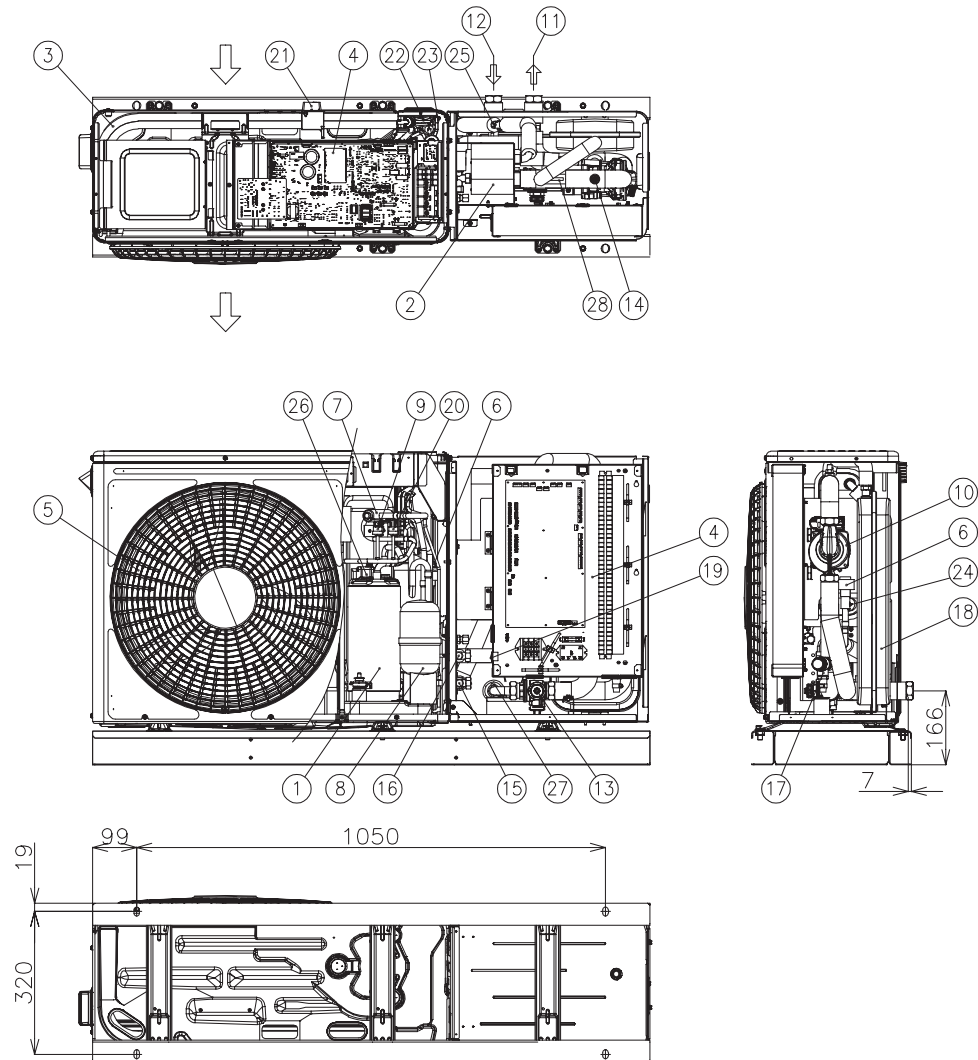


## Name of parts and dimensional data

2.1	YUTAKI M R32 .....	20
2.1.1	RASM-(2/3)VRE.....	20
2.1.2	RASM-(4-7)(V)R1E .....	21
2.2	YUTAKI Hydrosplit R32 - RASM-(4-7)(V)WR1E .....	22
2.3	YUTAKI H - HWM-WE.....	23
2.4	YUTAKI H Combi - HWD-WE-220S.....	24
2.5	YUTAKI H Combi - HWD-WE-220S-K.....	25

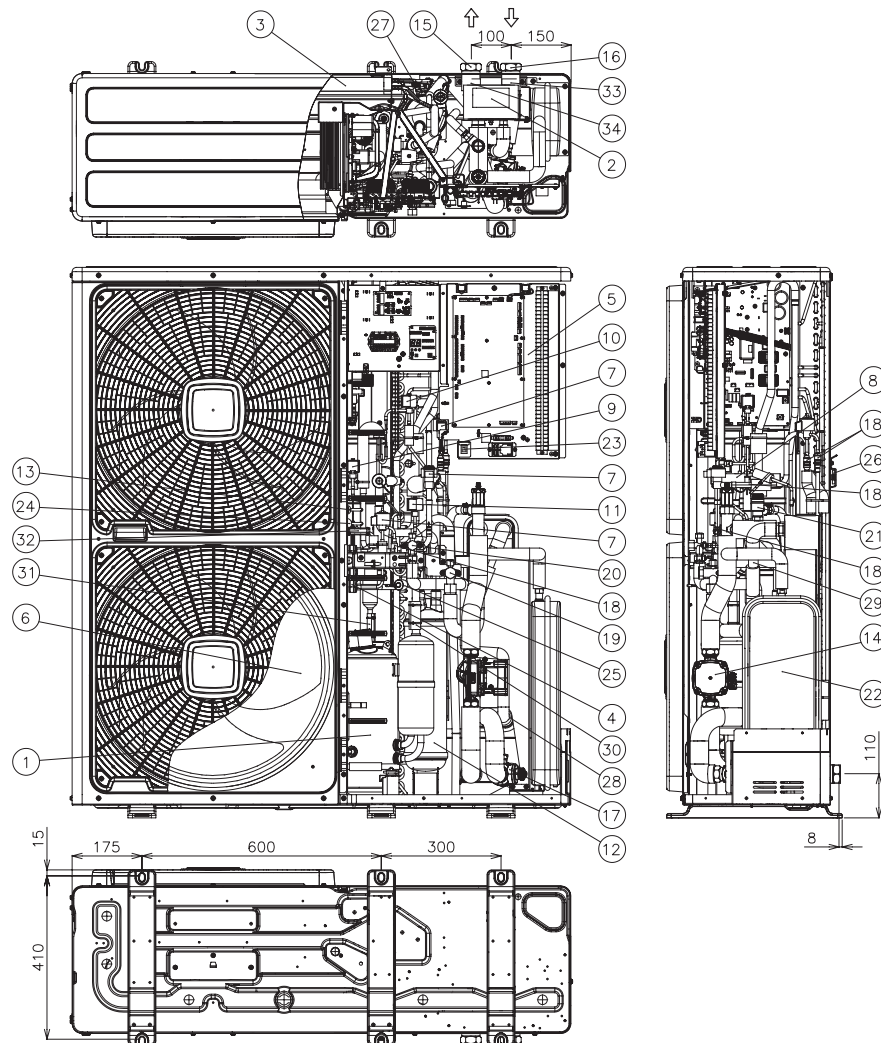
## 2.1 YUTAKI M R32

### 2.1.1 RASM-(2/3)VRE



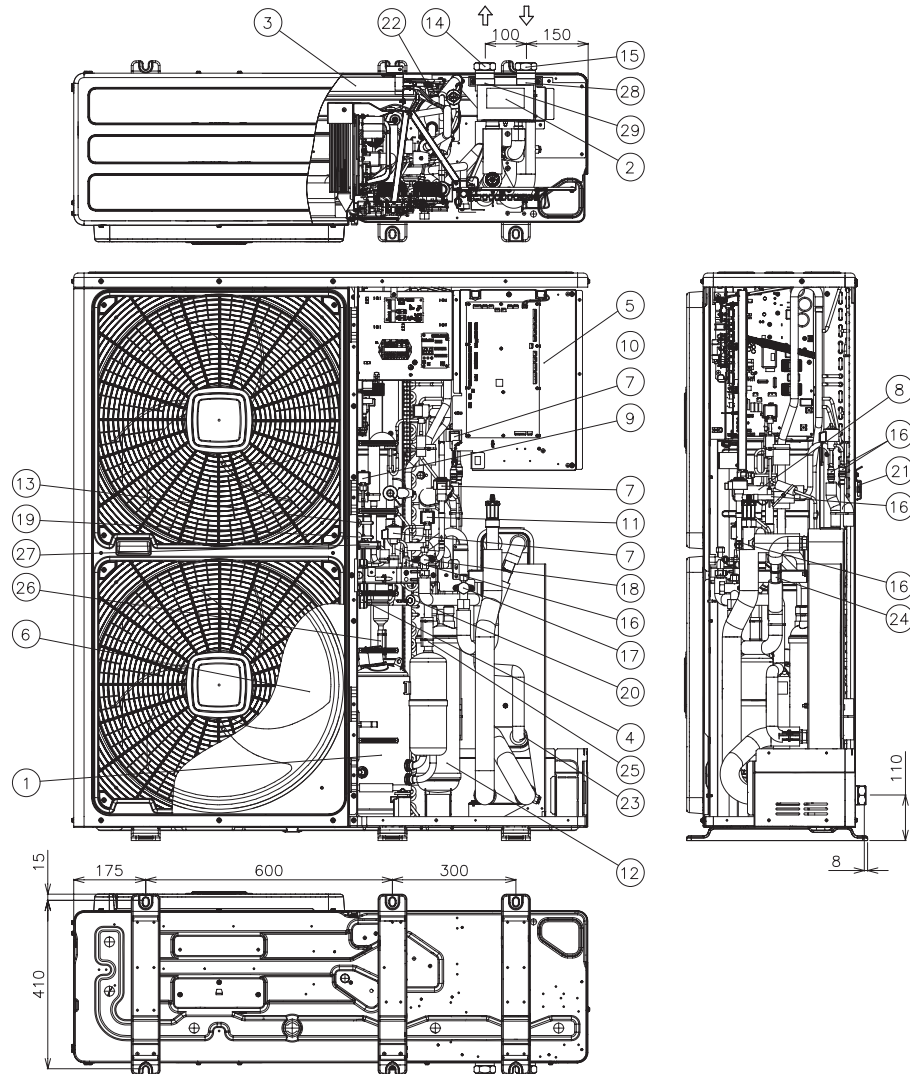
- 1. Compressor
- 2. Water side heat exchanger
- 3. Air side heat exchanger
- 4. Electrical box
- 5. Fan (x1)
- 6. Expansion valve (x2)
- 7. Reversing valve
- 8. Accumulator
- 9. High pressure switch (PSH)
- 10. Water pump
- 11. Water outlet - G 1"
- 12. Water inlet - G1"
- 13. Water strainer
- 14. Air purger
- 15. Stop valve for gas line Ø15.88 (5/8")
- 16. Stop valve for liquid line - 2HP: Ø6,35(1/4") - 3HP: Ø9.52 (3/8")
- 17. Safety valve
- 18. Expansion vessel 6L
- 19. Switch for DHW "emergency" operation
- 20. Pressure switch for control (Psc)
- 21. Ambient thermistor
- 22. Liquid temperature thermistor
- 23. Liquid temperature thermistor
- 24. Refrigerant liquid pipe thermistor
- 25. Refrigerant gas pipe thermistor
- 26. Compressor discharge thermistor
- 27. Water inlet thermistor
- 28. Water outlet thermistor

## 2.1.2 RASM-(4-7)(V)R1E



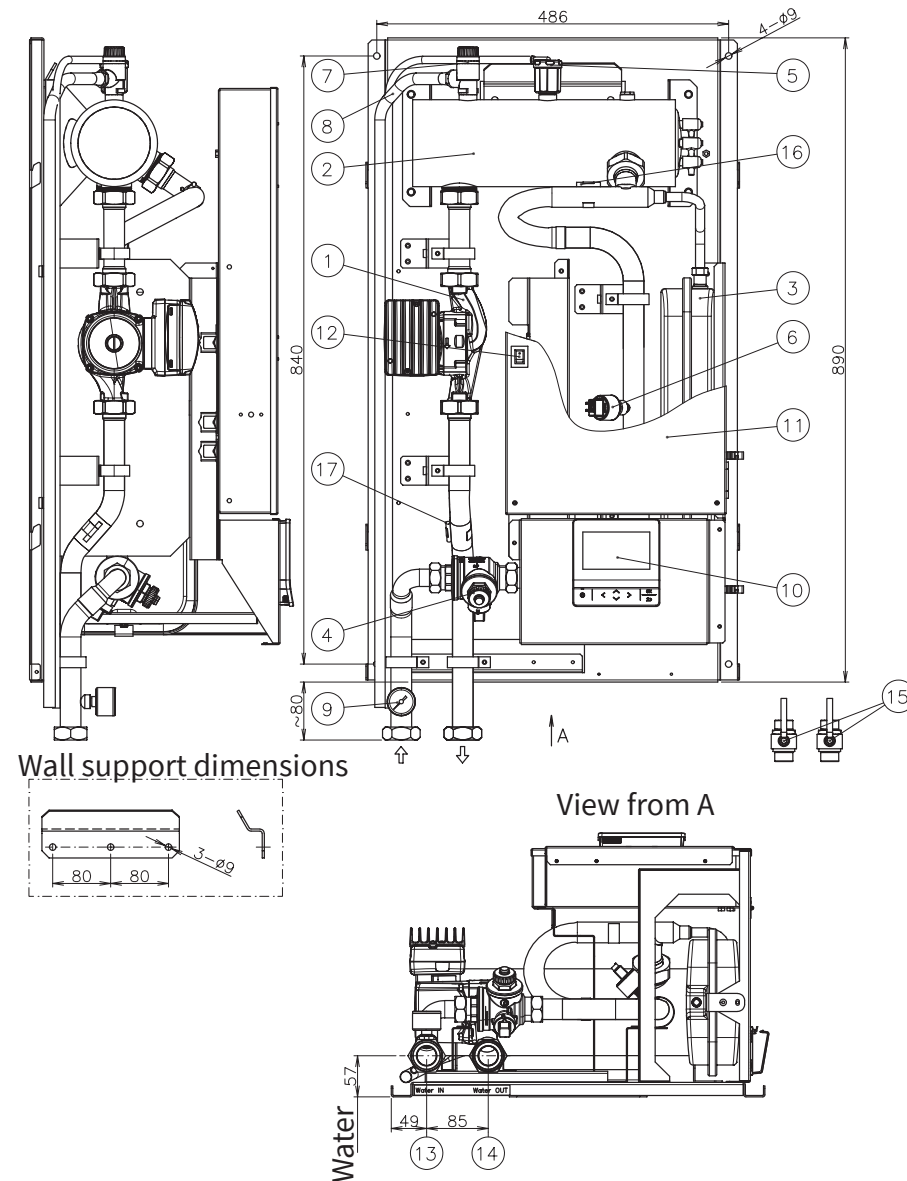
1. Compressor
2. Water side heat exchanger
3. Air side heat exchanger
4. Economizer
5. Electrical box
6. Fan (x2)
7. Expansion valve (x3)
8. Reversing valve
9. Solenoid valve (SVA)
10. Solenoid valve (SVC)
11. Solenoid valve (SVE)
12. Accumulator
13. High pressure switch (PSH)
14. Water pump
15. Water Outlet (1-1/4")
16. Water inlet (1-1/4")
17. Water strainer
18. Refrigerant strainer (x5)
19. Stop valve for gas line Ø15.88 (5/8")
20. Stop valve for liquid line Ø9.52(3/8")
21. Safety valve
22. Expansion vessel
23. Switch for DHW "emergency" operation
24. Sensor for refrigerant pressure (Pd)
25. Sensor for refrigerant pressure (Ps)
26. Ambient thermistor
27. Evaporation thermistor
28. Liquid refrigerant pipe in heating thermistor
29. Gas refrigerant pipe thermistor
30. Compressor suction thermistor
31. Compressor discharge thermistor
32. Outlet economizer thermistor
33. Water inlet pipe thermistor
34. Water outlet pipe thermistor

## 2.2 YUTAKI Hydrosplit R32 - RASM-(4-7)(V)WR1E



- |  |   |
|--|---|
| <ol style="list-style-type: none"> <li>1. Compressor</li> <li>2. Water side heat exchanger</li> <li>3. Air side heat exchanger</li> <li>4. Economizer</li> <li>5. Electrical box</li> <li>6. Fan (x2)</li> <li>7. Expansion valve (x3)</li> <li>8. Reversing valve</li> <li>9. Solenoid valve (SVA)</li> <li>10. Solenoid valve (SVC)</li> <li>11. Solenoid valve (SVE)</li> <li>12. Accumulator</li> <li>13. High pressure switch (PSH)</li> <li>14. Water Outlet (1-1/4")</li> <li>15. Water inlet (1-1/4")</li> <li>16. Refrigerant strainer (x5)</li> <li>17. Stop valve for gas line Ø15.88 (5/8")</li> <li>18. Stop valve for liquid line</li> </ol> | <ol style="list-style-type: none"> <li>19. Sensor for refrigerant pressure (Pd) Ø9.52(3/8")</li> <li>20. Sensor for refrigerant pressure (Ps)</li> <li>21. Ambient thermistor</li> <li>22. Evaporation thermistor</li> <li>23. Liquid refrigerant pipe in heating thermistor</li> <li>24. Gas refrigerant pipe thermistor</li> <li>25. Compressor suction thermistor</li> <li>26. Compressor discharge thermistor</li> <li>27. Outlet economizer thermistor</li> <li>28. Water inlet pipe thermistor</li> <li>29. Thermistor (Two)</li> </ol> |
|--|---|

## 2.3 YUTAKI H - HWM-WE

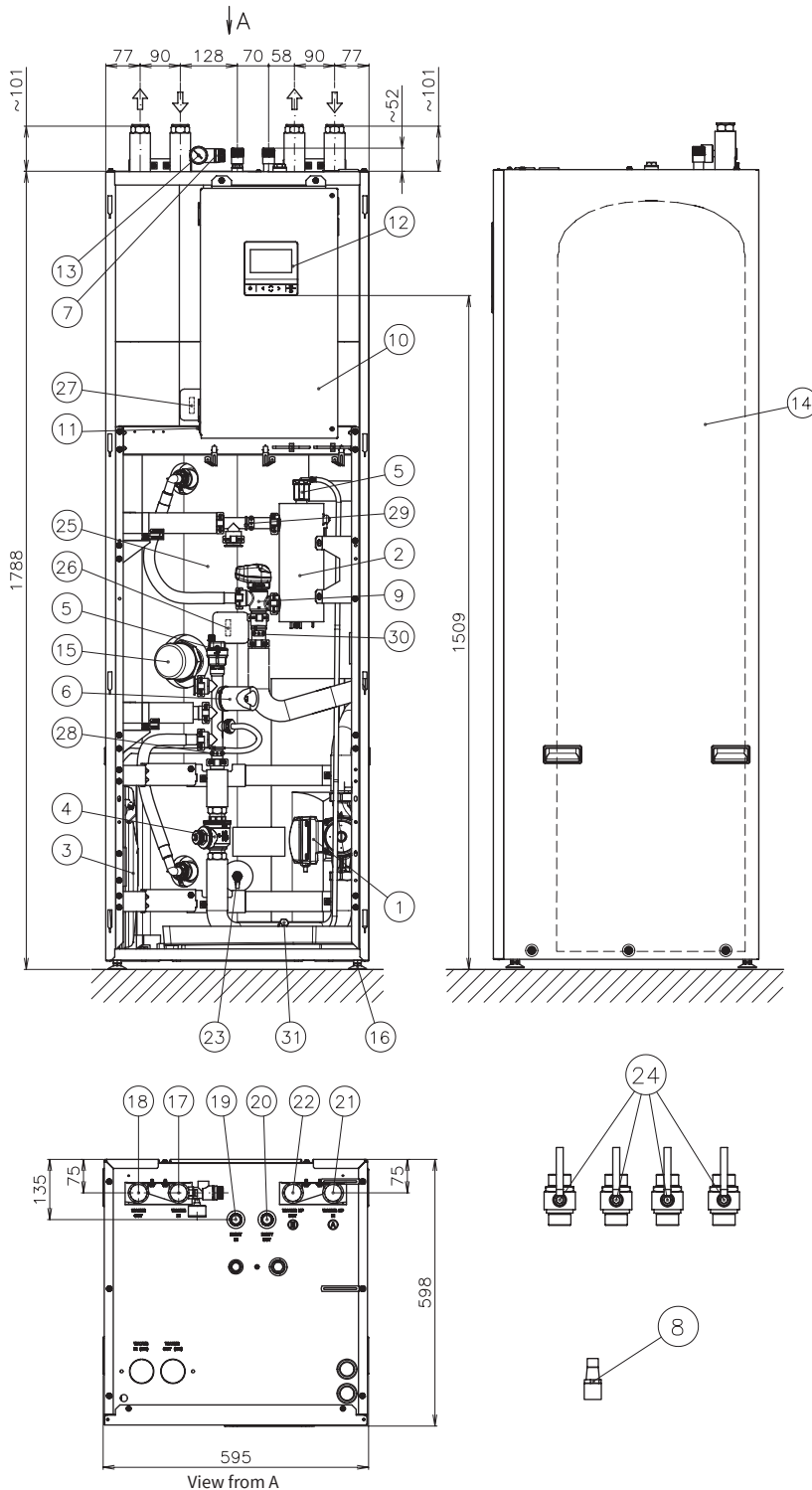


1. Water pump
2. Electric water heater
3. Expansion vessel (6 Liters)
4. Water strainer
5. Air purger
6. Water pressure sensor
7. Safety valve
8. Drain pipe for safety valve
9. Manometer
10. Unit controller
11. Electrical box
12. Switch for DHW emergency operation
13. Water inlet pipe connection (G 1-1/4" (female))
14. Water outlet pipe connection (G 1-1/4" (female))
15. Thermistor (Water inlet pipe)
16. Thermistor (Water outlet pipe)

**i** NOTE

← Water flow direction

## 2.4 YUTAKI H Combi - HWD-WE-220S



1. Water pump
2. Electric water heater
3. Expansion vessel (6 Liters)
4. Water strainer
5. Air purger (x2)
6. Water pressure sensor
7. Safety valve
8. Drain pipe for safety valve (Factory-supplied accessory)
9. 3-way valve (for space heating and DHW)
10. Electrical box
11. Switch for DHW "emergency operation"
12. LCD Controller
13. Manometer
14. DHW tank (220 L)
15. DHW tank heater + thermostat
16. Mounting foot (x4)
17. Water inlet connection (G1" (female))
18. Water outlet connection (G1" (female))
19. DHW inlet connection (G3/4" (male))
20. DHW outlet connection (G3/4" (male))
21. Water HP inlet connection (G1" (female))
22. Water HP outlet connection (G1" (female))
23. Drain port (for DHW) (G3/8")
24. Shutdown valve (factory-supplied accessory)
25. Tank insulation
26. DHW thermistor 1 (Down)
27. DHW thermistor 2 (Up)
28. Water inlet thermistor (THMwi)
29. Water outlet thermistor (THMwo)
30. Water heat pump thermistor (THMwohp)
31. Drain port (for unit) (G3/8")



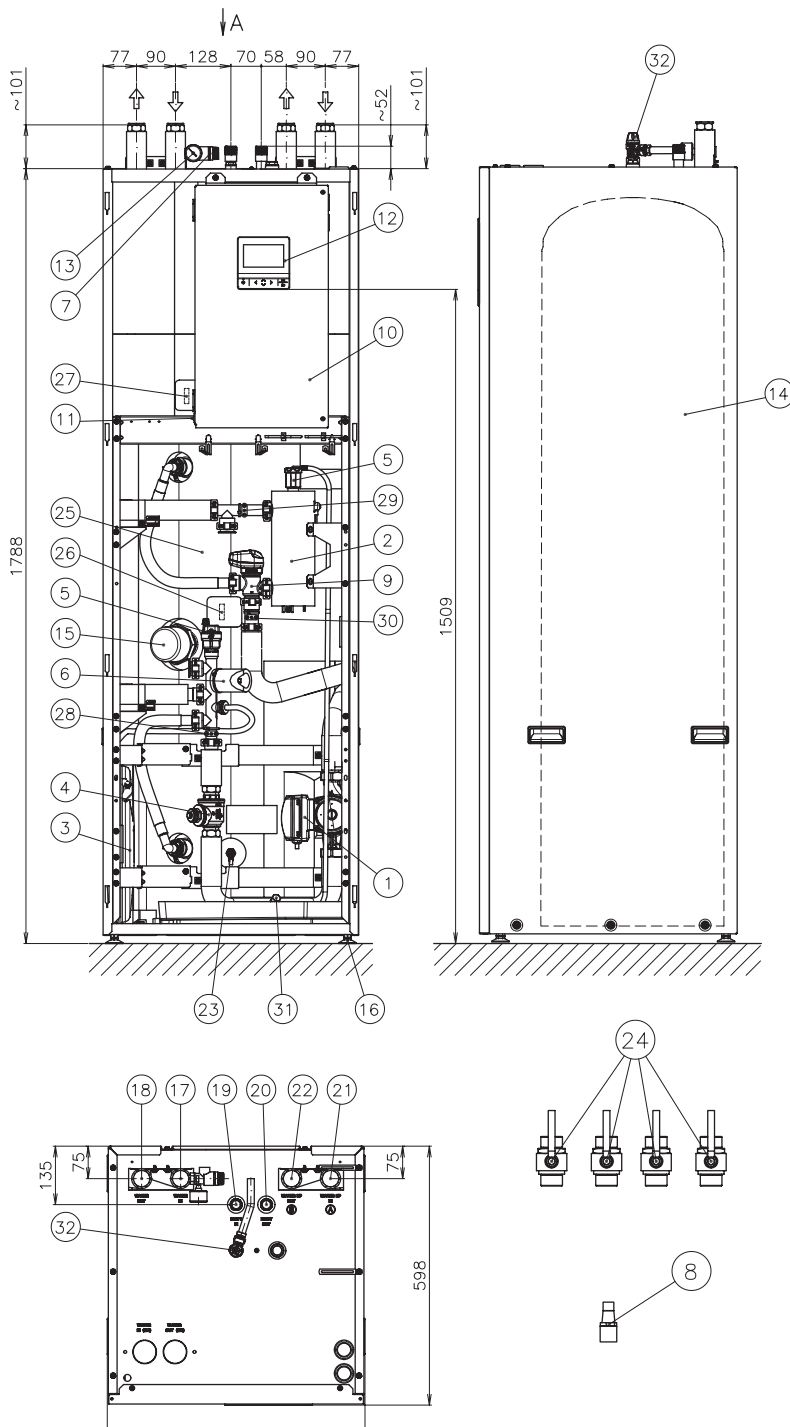
### NOTE



Water flow direction



## 2.5 YUTAKI H Combi - HWD-WE-220S-K



View from A



### NOTE



Water flow direction

1. Water pump
2. Electric water heater
3. Expansion vessel (6 Liters)
4. Water strainer
5. Air purger (x2)
6. Water pressure sensor
7. Safety valve
8. Drain pipe for safety valve (Factory-supplied accessory)
9. 3-way valve (for space heating and DHW)
10. Electrical box
11. Switch for DHW "emergency operation"
12. LCD Controller
13. Manometer
14. DHW tank (220 L)
15. DHW tank heater + thermostat
16. Mounting foot (x4)
17. Water inlet connection (G1" (female))
18. Water outlet connection (G1" (female))
19. DHW inlet connection (G3/4" (male))
20. DHW outlet connection (G3/4" (male))
21. Water HP inlet connection (G1" (female))
22. Water HP outlet connection (G1" (female))
23. Drain port (for DHW) (G3/8")
24. Shutdown valve (factory-supplied accessory)
25. Tank insulation
26. DHW thermistor 1 (Down)
27. DHW thermistor 2 (Up)
28. Water inlet thermistor (THMwi)
29. Water outlet thermistor (THMwo)
30. Water heat pump thermistor (THMwohp)
31. Drain port (for unit) (G3/8")
32. Pressure and temperature valve



## Electrical data

3.1	Considerations.....	27
3.1.1	Monobloc system .....	28
3.1.2	Hydrosplit system - Outdoor unit .....	29
3.1.2.1	RAS-(4-7)(V)WR1E in combination with YUTAKI H, YUTAKI H Combi .....	29
3.1.3	Hydrosplit system - Indoor unit .....	29
3.1.3.1	YUTAKI H .....	29
3.1.3.2	YUTAKI H Combi .....	30

## 3.1 Considerations

Key words:

- U: Voltage.
- IPT: Total input power.
- RNC: Running current.
- MC: Maximum current.

### NOTE

- *Heating conditions: Inlet/outlet water temperature: 30/35 °C ; Outdoor ambient temperature (DB/WB): 7/6 °C*
- *The compressor data shown in the tables below are based on a combined capacity of 100% of the power supplied.*
- *The “Maximum current” shown in the above table is the maximum total unit running current at the following conditions:*
  - ✓ *Supply voltage: 90% of the rated voltage.*
  - ✓ *Unit capacity: 100% at maximum operating conditions.*
- *The power supply cables must be sized to cover this maximum current value.*
- *Specifications in these tables are subject to change without notice in order that HITACHI may bring the latest innovations to their customers.*
- *Please refer to the general information, cautions and notes regarding protective devices (CB, ELB) throughout the “**Electrical and control settings**” chapter.*

## 3.1.1 Monobloc system

### ◆ YUTAKI M (R32)

#### RASM-(2-3)VRE

Model	Power supply	Applicable voltage		Operation mode	Cooling operation		Heating operation		MC (A)	Max. IPT (kW)
		U max. (V)	U min. (V)		RNC (A)	IPT (kW)	RNC (A)	IPT (kW)		
RASM-2VRE	~ 230V 50Hz	253	207	Without DHW tank heater	4.8	1.00	5.5	1.14	10.6	2.32
				With DHW tank heater	4.8	1.00	18.8	3.89	23.1	5.07
RASM-3VRE				Without DHW tank heater	9.4	1.94	8.9	1.84	16.0	3.54
				With DHW tank heater	9.4	1.94	22.2	4.59	28.5	6.29

### NOTE

The data corresponding to DHW tank heater is calculated in combination with the domestic hot water tank accessory “DHWT-(200/300)S-3.0H2E”.

#### RASM-(4-7)(V)R1E

Model	Power supply	Applicable voltage		Operation mode	Cooling operation		Heating operation		MC (A)	Max. IPT (kW)			
		U max. (V)	U min. (V)		RNC (A)	IPT (kW)	RNC (A)	IPT (kW)					
RASM-4VR1E	~ 230V 50Hz	253	207	Without DHW tank heater	14.3	3.26	10.4	2.36	28.8	5.98			
				With DHW tank heater	10.2	2.18	20.6	4.40	41.3	8.81			
RASM-5VR1E				Without DHW tank heater	16.0	3.65	11.7	2.67	28.8	5.98			
				With DHW tank heater	10.2	2.18	20.6	4.40	41.3	8.81			
RASM-6VR1E				Without DHW tank heater	17.7	4.04	12.7	2.89	28.8	5.98			
				With DHW tank heater	10.2	2.18	20.6	4.40	41.3	8.81			
RASM-4R1E				3N~ 400V 50Hz	440	360	Without DHW tank heater	5.2	3.26	3.8	2.36	16.3	9.17
							With DHW tank heater	5.2	2.19	11.9	4.95	28.8	12.01
RASM-5R1E							Without DHW tank heater	5.8	3.65	4.3	2.67	16.3	9.17
							With DHW tank heater	5.2	2.18	11.9	4.95	28.8	12.01
RASM-6R1E							Without DHW tank heater	6.5	4.04	4.6	2.89	16.3	9.17
							With DHW tank heater	5.2	2.18	11.9	4.95	28.8	12.01
RASM-7R1E	Without DHW tank heater	7.2	4.46				5.8	3.62	16.3	9.17			
	With DHW tank heater	5.2	2.18				11.9	4.95	28.8	12.01			

### NOTE

The data corresponding to DHW tank heater is calculated in combination with the domestic hot water tank accessory “DHWT-(200/300)S-3.0H2E”.

## 3.1.2 Hydrosplit system - Outdoor unit

### 3.1.2.1 RAS-(4-7)(V)WR1E in combination with YUTAKI H, YUTAKI H Combi

Model	Power supply	Applicable voltage		Compressor and fan motors				MC (A)	Max. IPT (kW)
				Cooling		Heating			
		U max. (V)	U min. (V)	RNC (A)	IPT (kW)	RNC (A)	IPT (kW)		
RASM-4VRW1E	~ 230V 50Hz	253	207	14.3	3.26	10.3	2.34	28.5	5.90
RASM-5VRW1E				16.0	3.65	11.7	2.67	28.5	5.90
RASM-6VRW1E				17.7	4.04	12.7	2.89	28.5	5.90
RASM-4RW1E	3N~ 400V 50Hz	440	360	5.2	3.26	3.8	2.34	16.0	9.10
RASM-5RW1E				5.8	3.65	4.3	2.67	16.0	9.10
RASM-6RW1E				6.5	4.04	4.6	2.89	16.0	9.10
RASM-7RW1E				7.2	4.46	5.8	3.62	16.0	9.10

## 3.1.3 Hydrosplit system - Indoor unit

### 3.1.3.1 YUTAKI H

#### HWM-WE

Model	Power supply	Applicable voltage		Operation mode	RNC (A)	IPT (kW)	MC (A)	Max. IPT (kW)
		U max. (V)	U min. (V)					
HWM-WE	~ 230V 50Hz	253	207	Without electric heater	1.4	0.18	1.47	0.18
				With electric heater	27.6	6.18	27.6	6.18
				With DHW tank heater	14.5	3.18	14.5	3.18
				With DHW tank heater and electric heaters	40.6	9.18	40.6	9.18
	3N~ 400V 50Hz	440	360	Without electric heater	1.4	0.18	1.47	0.18
				With electric heater	9.6	6.18	10.1	6.18
				With DHW tank heater	4.8	3.18	14.5	3.18
				With DHW tank heater and electric heaters	13.7	9.18	23.2	9.18

#### NOTE

The data corresponding to DHW tank heater is calculated in combination with the domestic hot water tank accessory "DHWT-(200/300)S-3.0H2E".

## 3.1.3.2 YUTAKI H Combi

### **HWD-WE-220S(-K)**

Model	Power supply	Applicable voltage		Operation mode	RNC (A)	IPT (kW)	MC (A)	Max. IPT (kW)
		U max. (V)	U min. (V)					
HWD-WE-220S(-K)	~ 230V 50Hz	253	207	Without electric heater	1.4	0.18	1.47	0.18
				With electric heater	27.6	6.18	27.6	6.18
				With DHW tank heater	13.4	2.93	13.4	2.93
				With DHW tank heater and electric heaters	39.5	8.93	39.5	8.93
	3N~ 400V 50Hz	440	360	Without electric heater	1.4	0.18	1.47	0.18
				With electric heater	17.4	6.18	18.9	6.18
				With DHW tank heater	13.4	2.93	13.4	2.93
				With DHW tank heater and electric heaters	17.4	8.93	18.9	8.93

## Working range

4.1	Power supply working range.....	32
4.2	Temperature working range.....	32
4.2.1	Space heating .....	33
4.2.2	DHW .....	34
4.2.3	Swimming pool heating .....	35
4.2.4	Space cooling (Necessary cooling kit) .....	35
4.3	R32 Hydraulic working range .....	36
4.3.1	Hydraulic data .....	36
4.3.2	Pump performance curves .....	37
4.3.2.1	YUTAKI M R32 .....	37
4.3.2.2	YUTAKI Hydrosplit R32 + YUTAKI H.....	39
4.3.2.3	YUTAKI Hydrosplit R32 + YUTAKI H Combi .....	40

## 4.1 Power supply working range

### ◆ Nominal power supply

- Single phase: ~ 230V 50Hz
- Three phase: 3N~ 400V 50Hz

### ◆ Operating voltage

Between 90 and 110% of the nominal voltage.

### ◆ Voltage imbalance for nominal power supply 3N~ 400V 50Hz

Up to 3% of each phase, measured at the main terminal of the outdoor unit.

### ◆ Starting voltage

Always higher than 85% of the nominal voltage.

### ◆ Relative humidity limit

Lower than 80%.

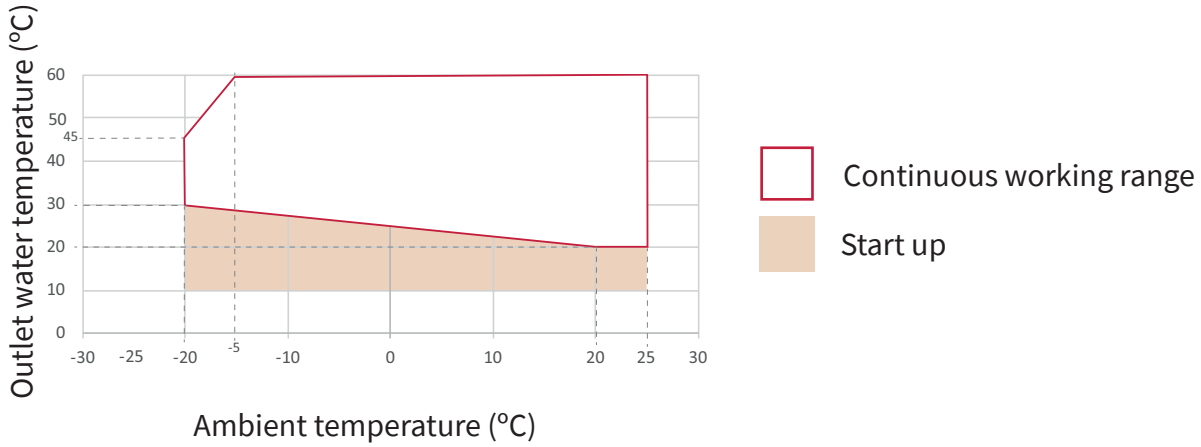
## 4.2 Temperature working range

MODEL	4.0HP	5.0HP	6.0HP	7.0HP
Water temperature	Refer to the graphics for each case			
Indoor ambient temperature	5~30			

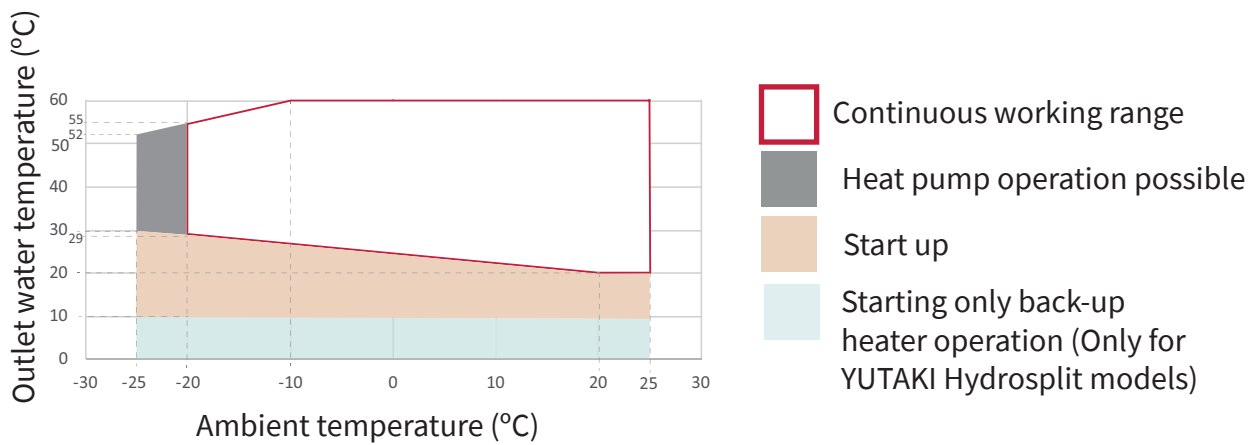


## 4.2.1 Space heating

### ◆ RASM-(2-3)VRE

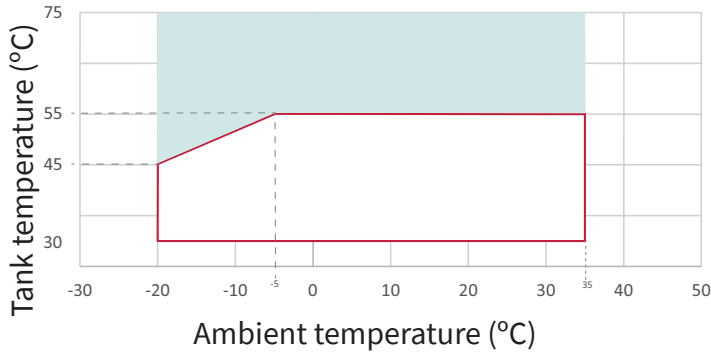


### ◆ RASM-(4-7)(V)R(W)1E



## 4.2.2 DHW

### ◆ RASM-(2-3)VRE

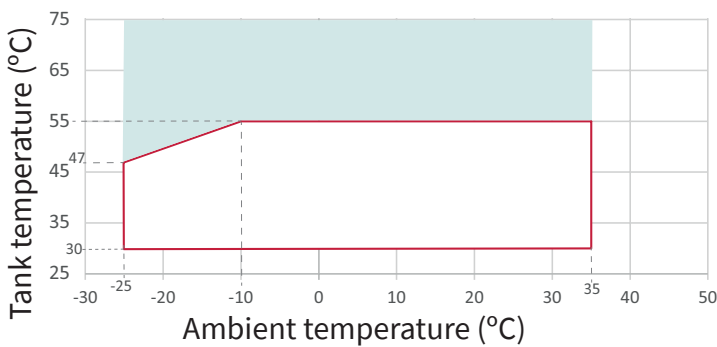


Continuous working range  
 Tank heater

### **i** NOTE

Area marked with  only available if DHW tank back-up heater is enabled.

### ◆ RASM-(4-7)(V)R(W)1E



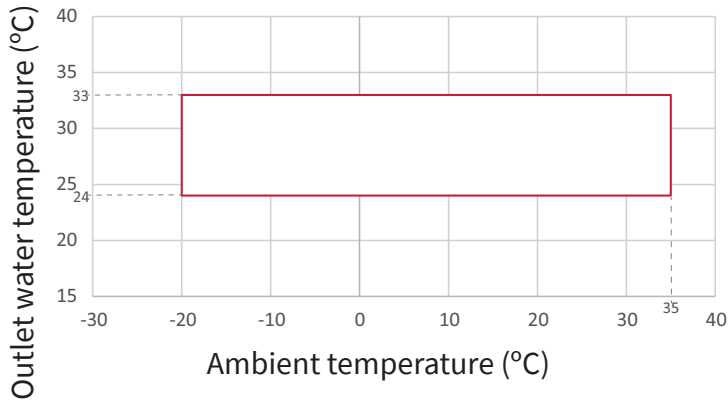
Continuous working range  
 Tank heater


### **i** NOTE

Area marked with  only available if DHW tank back-up heater is enabled.

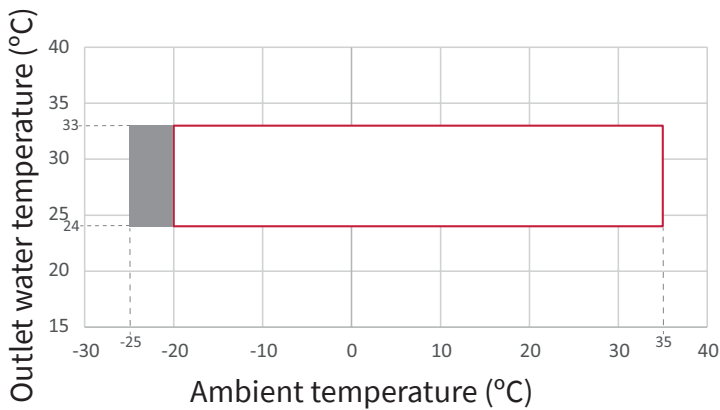
## 4.2.3 Swimming pool heating



### ◆ RASM-(2-3)VRE



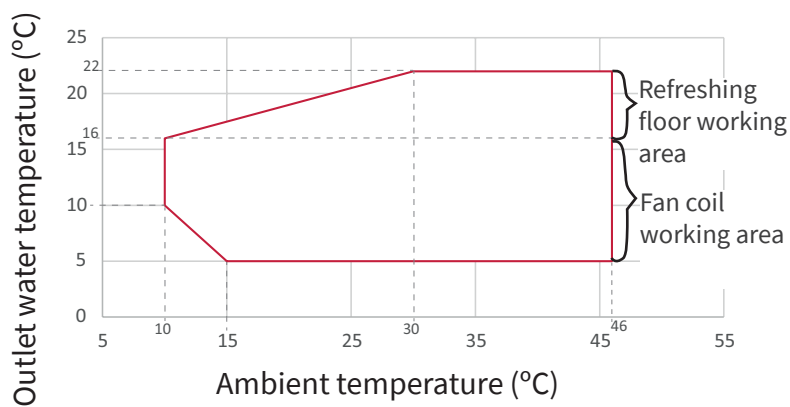
 Continuous working range

### ◆ RASM-(4-7)(V)R(W)1E



 Continuous working range  
 Heat pump operation possible

## 4.2.4 Space cooling (Necessary cooling kit)



 Continuous working range

## 4.3 R32 Hydraulic working range

### 4.3.1 Hydraulic data

#### ◆ YUTAKI M R32

MODEL		2.0 HP	2.5 HP	3.0 HP	4.0 HP	5.0 HP	6.0 HP	7.0 HP
Minimum water flow rate (*1)	m <sup>3</sup> /h	0.5	0.6	0.6	1.0	1.1	1.2	1.2
Maximum water flow rate (*1)	m <sup>3</sup> /h	1.9	2.0	2.1	2.8	3.0	3.0	3.0
Minimum installation water volume (*2)	l	28	28	28	50	55	55	65
Minimum allowable water pressure	MPa				0.1			
Maximum allowable water pressure	MPa				0.3			

#### ◆ YUTAKI Hydrosplit R32

MODEL		4.0 HP	5.0 HP	6.0 HP	7.0 HP
Minimum water flow rate (*1)	m <sup>3</sup> /h	1.0	1.1	1.2	1.2
Maximum water flow rate (*1)	m <sup>3</sup> /h	2.8	3.0	3.0	3.0
Minimum installation water volume (*2)	l	50	55	55	65
Minimum allowable water pressure	MPa			0.1	
Maximum allowable water pressure	MPa			0.3	

#### NOTE

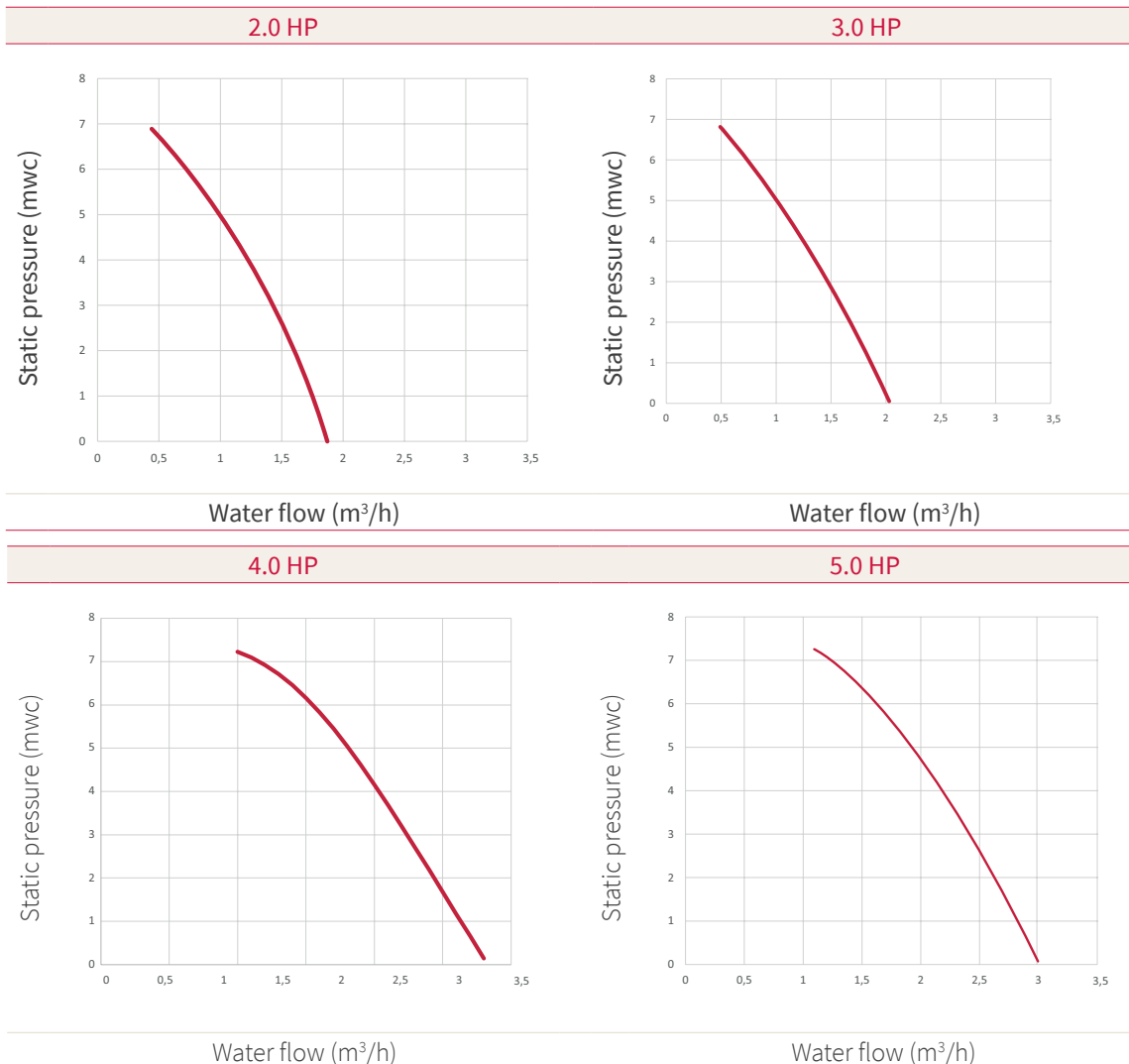
- (\*1): Values calculated based on the following conditions:
  - » Water inlet/outlet temperature: 30/35 °C
  - » Outdoor ambient temperature: (DB/WB): 7/6 °C
- (\*2): Values calculated with an ON/OFF temperature differential value of 4 °C.

## 4.3.2 Pump performance curves

### **i** NOTE

If a water flow rate is selected out of the working range of the unit, it can cause malfunction on the unit. Please, try to operate the pump within the minimum and maximum water flow.

### 4.3.2.1 YUTAKI M R32



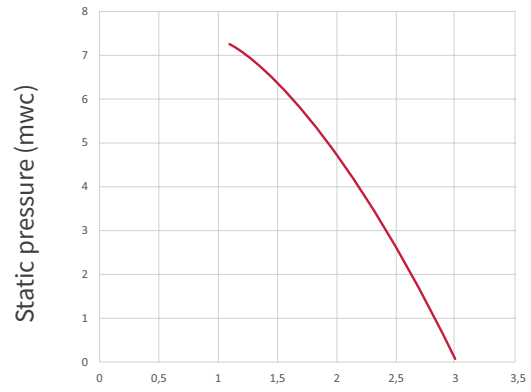
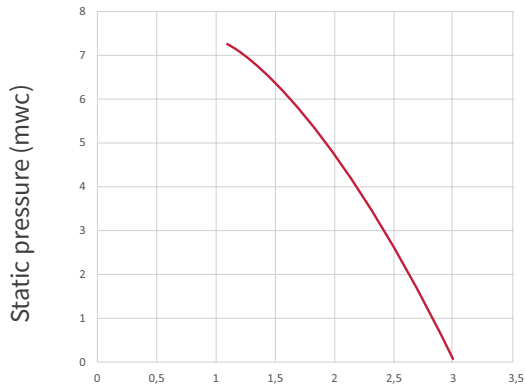
R32 HYDRAULIC WORKING RANGE

4

WORKING RANGE

6.0 HP

7.0 HP



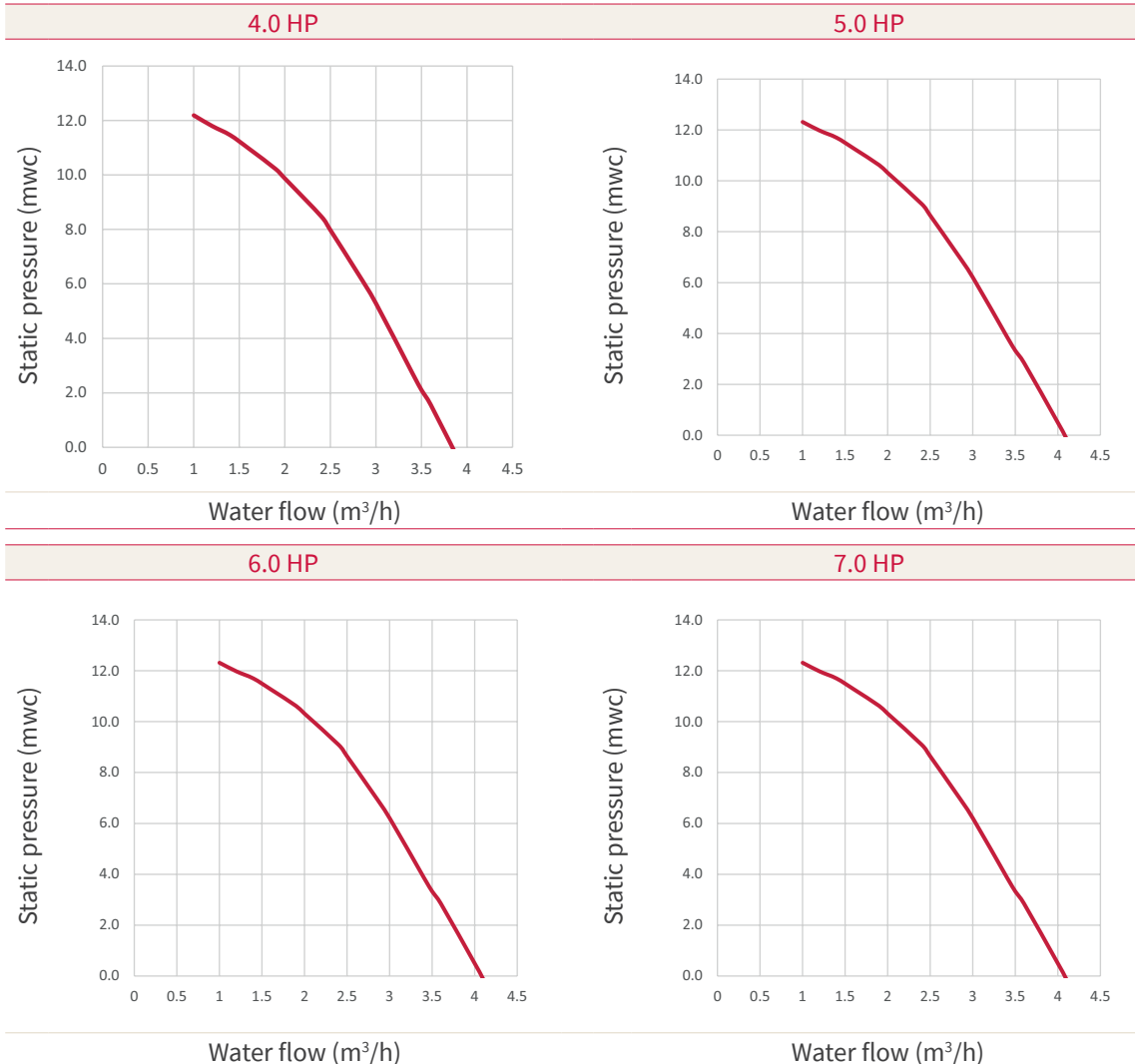
Water flow (m<sup>3</sup>/h)

Water flow (m<sup>3</sup>/h)

## 4.3.2.2 YUTAKI Hydrosplit R32 + YUTAKI H

### **i** NOTE

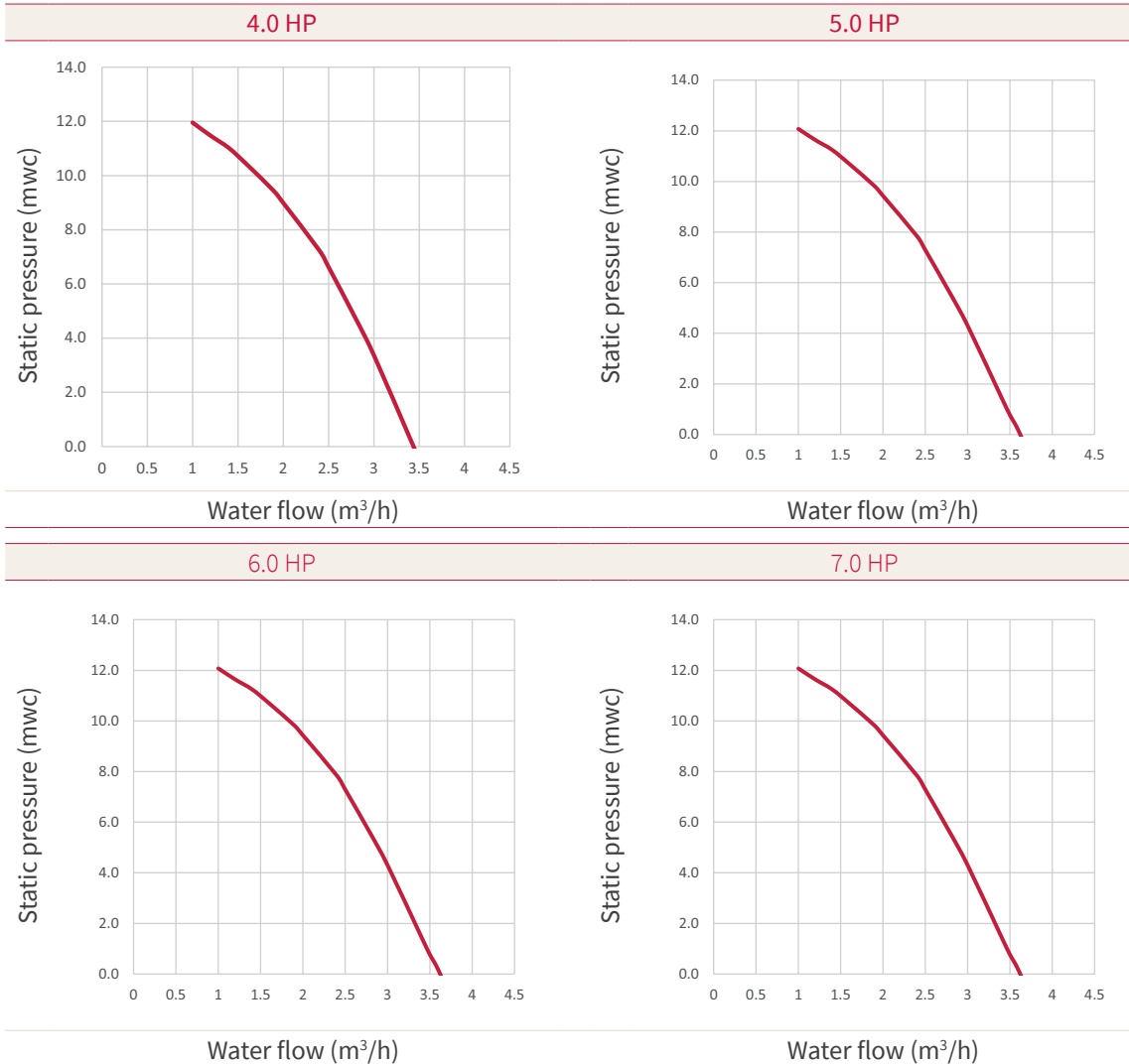
Available pressure shown is considering the system (outdoor units + indoor unit), without considering any pipe length which depends on the field installation.



## 4.3.2.3 YUTAKI Hydrosplit R32 + YUTAKI H Combi

### NOTE

Available pressure shown is considering the system (outdoor units + indoor unit), without considering any pipe length which depends on the field installation.





## ■ Drain and water piping

5.1	Water Drain Discharge Connection (Accessory).....	43
5.1.1	Connecting procedure.....	43
5.2	Outdoor Unit Draining Operation .....	44
5.3	Indoor Unit Draining Operation .....	44
5.3.1	Draining operation for YUTAKI H.....	44
5.3.2	Draining operation for YUTAKI H Combi .....	45
5.4	YUTAKI Hydraulic Connections.....	46
5.4.1	Hydraulic Connections for YUTAKI M .....	46
5.4.2	Hydraulic Connections for YUTAKI HYDROSPLIT and YUTAKI H .....	46
5.4.3	Hydraulic Connections for YUTAKI HYDROSPLIT and YUTAKI H Combi .....	47
5.4.4	Parts name list.....	47
5.5	Space heating and DHW for YUTAKI M / YUTAKI Hydrosplit .....	49
5.5.1	Additional hydraulic necessary elements for space heating.....	49
5.5.2	Additional hydraulic necessary elements for DHW.....	50
5.5.3	Additional hydraulic optional elements (For DHW).....	52
5.5.4	Requirements and recommendations for the hydraulic circuit .....	53
5.5.5	Anti-freezing protection for water circuit.....	54

5.5.6 Glycol as anti-freezing protection .....	54
5.5.7 Insulation .....	56
5.5.8 Water filling.....	56
5.5.9 Water quality.....	58
5.6 Minimum water volume description .....	60
5.7 Water piping.....	62
5.7.1 Water piping length.....	62
5.7.2 Water piping size.....	62
5.8 Suspension of water piping .....	63

## 5.1 Water Drain Discharge Connection (Accessory)

When the base of the outdoor unit is temporarily utilized as a drain receiver and the drain water in it is discharged, this drain boss is utilized to connect the drain piping.

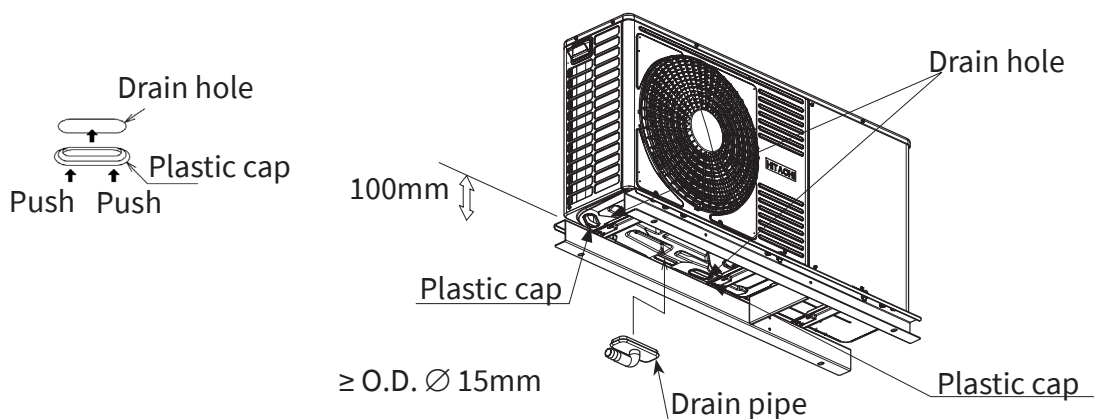
Model	Applicable model
DBS-12L	RASM-(2/3)VRE
DBS-26	RASM-(4-7)(V)R(W)1E

### 5.1.1 Connecting procedure

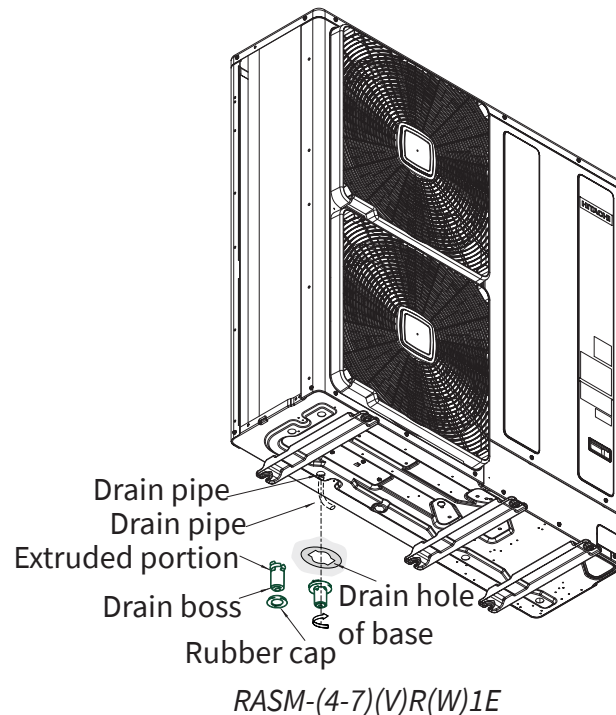
- 1 Insert the plastic cap into the drain boss up to the extruded portions.
- 2 Insert the boss into the unit base up to the extruded portions.
- 3 Size of the drain boss is:
  - ✓ RASM-(2/3)VRE: Ø15 mm (O.D.)
  - ✓ RASM-(4-7)(V)R(W)1E: Ø32 mm (O.D.)
- 4 A drain pipe should be field-supplied.

#### **i** NOTE

- Do not use this drain boss set in a cold area, because the drain water may freeze.
- This drain boss is not sufficient to collect all the drain water. If collecting drain water is completely required, provide a drain-pan that is bigger than the unit base and install it under the unit with drainage.



RASM-(2/3)VRE



## 5.2 Outdoor Unit Draining Operation

YUTAKI M / YUTAKI Hydrosplit has no drain port factory supplied. It is highly recommended to install a drain port valve attached to the water outlet of the YUTAKI M / YUTAKI Hydrosplit unit in order to ease the operation of draining. When the drain port is installed the draining procedure for the YUTAKI M / YUTAKI Hydrosplit follows the next steps:

- 1 Switch OFF the main power of the unit.
- 2 Close the shut-off valve installed at the water inlet connection (field supplied).
- 3 Connect a pipe or a drain hose to the drain port (field supplied) placed in the water outlet pipe of the unit.
- 4 Open manually the drain port of the shut-off valve (field supplied), and collect the water into a bucket (or to a sewage system)
- 5 Once all the water has been drained, and all maintenance operations have been finished, close again the drain port and open again the valve of the water inlet pipe to restart the normal operation of the unit.

## 5.3 Indoor Unit Draining Operation

### 5.3.1 Draining operation for YUTAKI H

YUTAKI H models have no drain port factory supplied. It must be considered the installation of a drain port after the shut-off valve (factory supplied) and before the water inlet of the unit when proceeding to the installation of the unit.

## 5.3.2 Draining operation for YUTAKI H Combi

### ◆ Draining of the indoor unit

- 1 Switch OFF the main power supply of the indoor unit.
- 2 Close the 4 shut-off valves installed at the space heating and outdoor unit connections (Water inlet and outlet connections).
- 3 Open manually the drain port for indoor unit water and collect the water into a bucket.
- 4 Once all the water has been drained, close again the drain port for indoor unit water.

#### ⚠ CAUTION

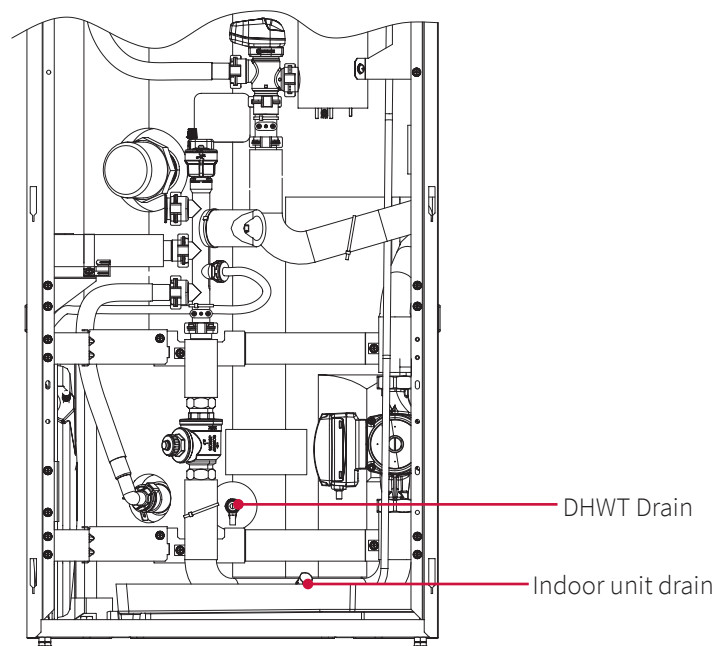
*When draining the indoor unit water from its drain port, the leaved water could be hot and could keep in pressure. Perform the draining procedure carefully.*

### ◆ Draining of the DHW circuit

- 1 Switch OFF the main power supply of the indoor unit.
- 2 Close the main DHW inlet valve (water inlet shut-off valve) in order to avoid the tank filling.
- 3 Open the shut-off valve of the DHW outlet to allow draining without creating a vacuum. Ensure that valve at the highest level of the DHW system is also opened.
- 4 Connect a drain hose to the drain port for DHW and lead the other end to the general draining.
- 5 Open manually the drain port for DHW and wait a long time until all the water has been removed.

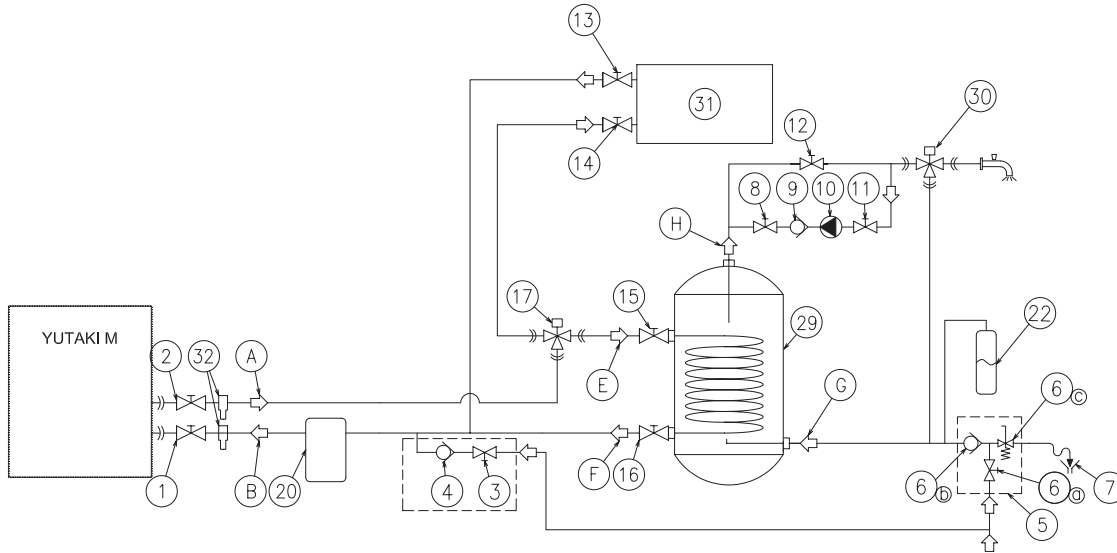
#### ⚠ CAUTION

*When draining the DHW from its drain port, the leaved water could be hot and could keep in pressure. Perform the draining procedure carefully.*

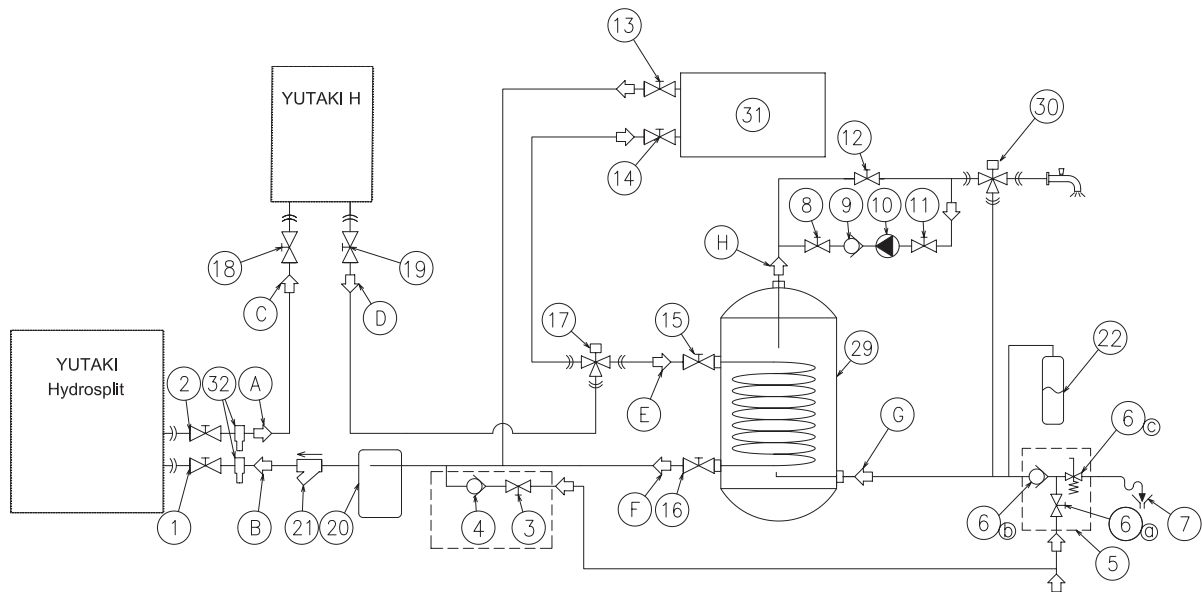


## 5.4 YUTAKI Hydraulic Connections

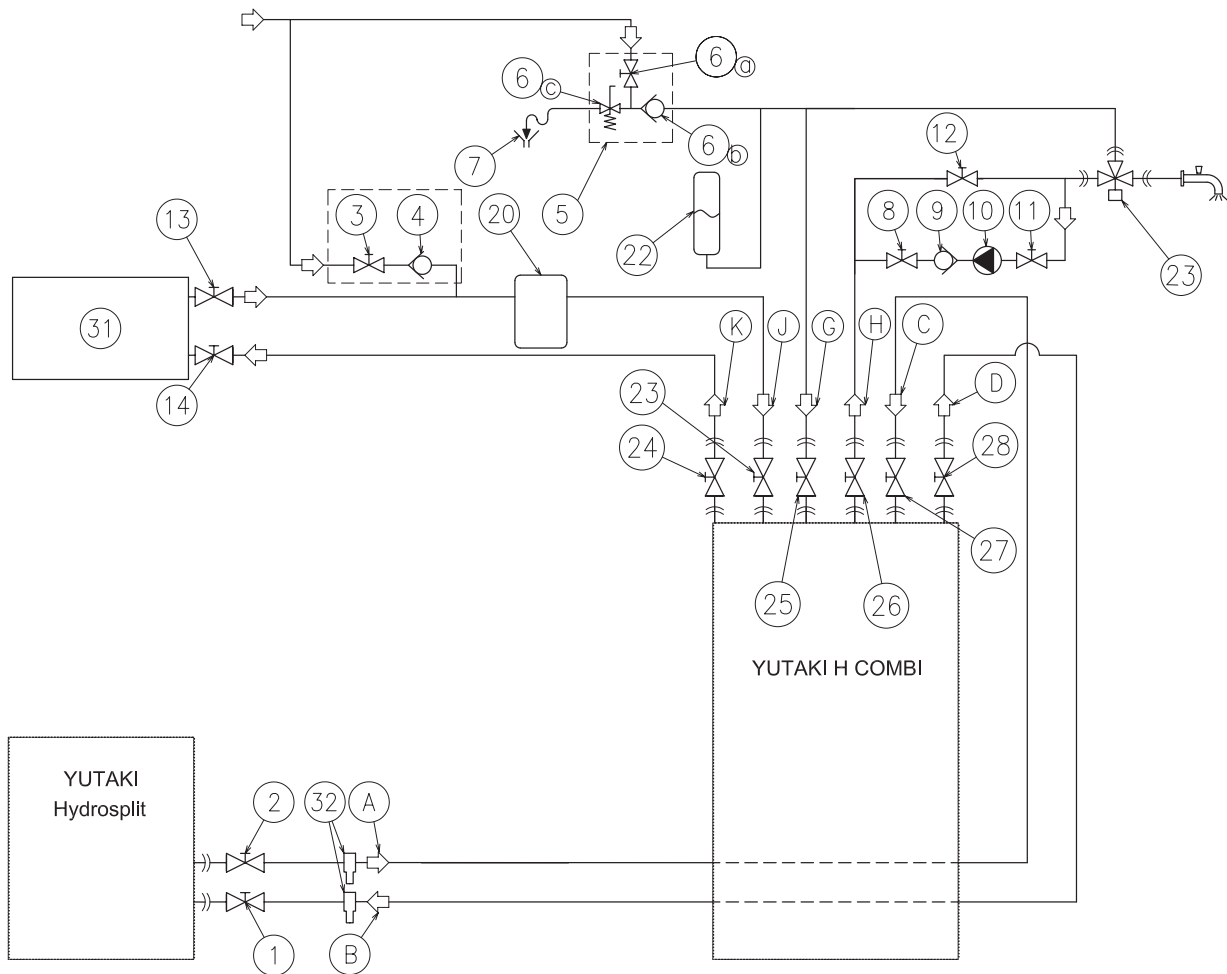
### 5.4.1 Hydraulic Connections for YUTAKI M



### 5.4.2 Hydraulic Connections for YUTAKI HYDROSPLIT and YUTAKI H



## 5.4.3 Hydraulic Connections for YUTAKI HYDROSPLIT and YUTAKI H Combi



## 5.4.4 Parts name list

Item	Nature	Part Name
A	Piping connections	Outdoor Heat pump water outlet
B	Piping connections	Outdoor Heat pump water inlet
C	Piping connections	Hydrosplit water inlet
D	Piping connections	Hydrosplit water outlet
E	Piping connections	DHW coil inlet
F	Piping connections	DHW coil outlet
G	Piping connections	Water inlet (DHW)
H	Piping connections	Water outlet (DHW)
J	Piping connections	Water inlet (Space Heating/Cooling)
K	Piping connections	Water outlet (Space Heating/Cooling)
1	Field supplied	Shut-off valve
2	Field supplied	Shut-off valve
3	Accessories	Shut-off valve (field supplied)
4	Accessories	Water check valve (ATW-WCV-01 accessory)

Item	Nature	Part Name
5	Accessories	Pressure and check valve (field supplied)
6	Field supplied	6a Shut-off valve
6	Field supplied	6b Water check valve
6	Field supplied	6c Pressure relief valve
7	Field supplied	Draining
8	Field supplied	Shut-off valve
9	Accessories	Water check valve (ATW-WCV-01 accessory)
10	Field supplied	Water pump
11	Field supplied	Shut-off valve
12	Field supplied	Shut-off valve
13	Field supplied	Shut-off valve
14	Field supplied	Shut-off valve
15	Field supplied	Shut-off valve
16	Field supplied	Shut-off valve
17	Accessories	3-way valve (ATW-3WV-01 accessory)
18	Unit supplied	Shut-off valve
19	Unit supplied	Shut-off valve
20	Field supplied	Buffer tank
21	Field supplied	Water strainer
22	Field supplied	Expansion vessel
23	Unit supplied	Shut-off valve
24	Unit supplied	Shut-off valve
25	Unit supplied	Shut-off valve
26	Unit supplied	Shut-off valve
27	Field supplied	Shut-off valve
28	Field supplied	Shut-off valve
29	Accessories	Domestic hot water tank (DHWT-(200/300)S-3.0H2E accessory)
30	Field supplied	Thermostatic mixing valve
31	-	Space Heating/Cooling Distribution
32	Field supplied	Antifreeze valve

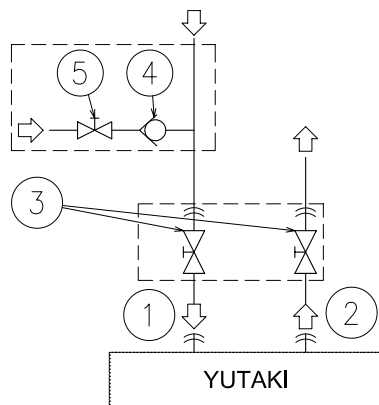


## 5.5 Space heating and DHW for YUTAKI M / YUTAKI Hydrosplit

### DANGER

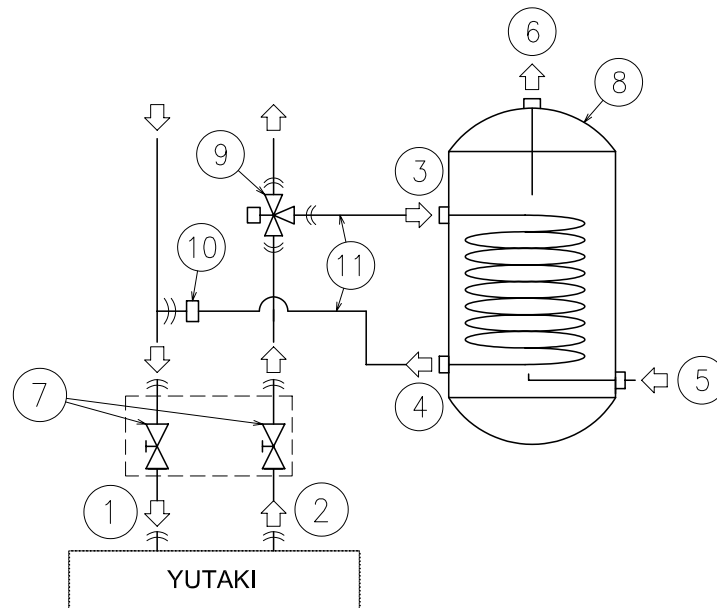
**Do not connect the power supply to the unit prior to filling the space heating circuit (and DHW circuit if it were the case) with water and checking water pressure and the total absence of any water leakage.**

### 5.5.1 Additional hydraulic necessary elements for space heating



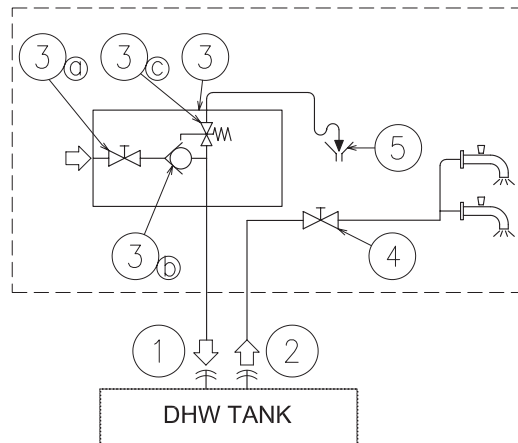
Nature	N°	Part name
Piping connections	1	Water inlet (Space heating)
	2	Water outlet (Space heating)
Field supplied	3	Shut-off valve (field supplied)
Accessories	4	Water check valve (ATW-WCV-01 accessory)
Field supplied	5	Shut-off valve

## 5.5.2 Additional hydraulic necessary elements for DHW



Nature	N°	Part name
Piping connections	1	Water inlet (Space heating)
	2	Water outlet (Space heating)
	3	Heating coil inlet
	4	Heating coil outlet
	5	Water inlet (DHW)
	6	Water outlet (DHW)
Field supplied	7	Shut-off valve (field supplied)
Accessories	8	Domestic hot water tank (DHWT-(200/300)S-3.0H2E accessory)
	9	3-way valve (ATW-3WV-01 accessory)
Field supplied	10	T-branch
	11	Heating coil pipes

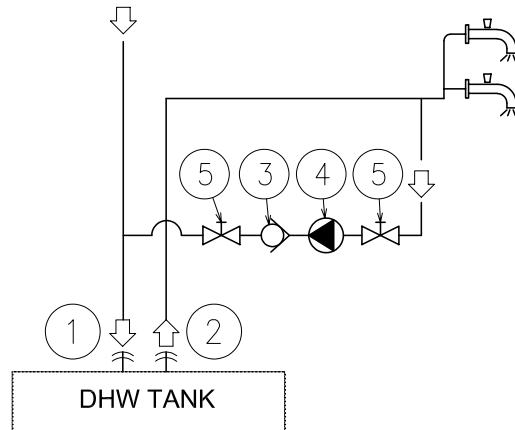
Additionally, the following elements are required for the DHW circuit:



Nature	N°	Part name
Piping connections	1	Water inlet (DHW)
	2	Water outlet (DHW)
Field supplied		Pressure and temperature relief valve
	3	3a Shut-off valve
		3b Water check valve
		3c Pressure relief valve
	4	Shut-off valve
	5	Draining

## 5.5.3 Additional hydraulic optional elements (For DHW)

In case of a recirculation circuit for the DHW circuit:



Nature	N°	Part name
Piping connections	1	Water inlet (DHW)
	2	Water outlet (DHW)
Accessories	3	Water check valve (ATW-WCV-01 accessory)
Field supplied	4	Water pump
	5	Shut-down valve

## 5.5.4 Requirements and recommendations for the hydraulic circuit

- The maximum piping length depends on the maximum pressure availability in the water outlet pipe. Please check the pump curves “4.3.2 Pump performance curves”.
- The units are equipped with a manual air purger (factory supplied) at the highest location of the unit. If this location is not the highest of the water installation, air might be trapped inside the water pipes, which could cause system malfunction. In that case additional air purgers (field supplied) should be installed to ensure no air enters the water circuit.
- For heating floor system, the air should be purged by means of an external pump and an open circuit to avoid air bags.
- When the unit is stopped during shut-off periods and the ambient temperature is very low, the water inside the pipes and the circulating pump may freeze, thus damaging the pipes and the water pump. In these cases, the installer shall ensure that the water temperature inside the pipes does not fall below the freezing point. In order to prevent this, the unit has a self-protection mechanism which should be activated (refer to the Service manual, “Optional functions” chapter).
- Check that the water pump of the space heating circuit works within the pump operating range and that the water flow is over the pump’s minimum. If the water flow is under 12 litres/minute for 4.0-7.0HP units (6 litres/minute for 2.0-3.0HP units) (with flow switch tolerance), alarm will be displayed on the unit.
- An additional special water filter is highly recommended to be installed on the space heating (field installation), in order to remove possible particles remaining from brazing which cannot be removed by the unit water strainer.
- In case of YUTAKI Hydrosplit in combination with YUTAKI H, it is mandatory to install additional water strainer into YUTAKI Hydrosplit outdoor unit water inlet connection.
- When selecting a tank for DHW operation, take into consideration the following points:
  - ✓ The storage capacity of the tank has to meet with the daily consumption in order to avoid stagnation of water.
  - ✓ Fresh water must circulate inside the DHW tank water circuit at least one time per day during the first days after the installation has been performed. Additionally, flush the system with fresh water when there is no consumption of DHW during long periods of time.
  - ✓ Try to avoid long runs of water piping between the tank and the DHW installation in order to decrease possible temperature losses.
  - ✓ If the domestic cold water entry pressure is higher than the equipment’s design pressure (10 bar), a pressure reducer must be fitted with a nominal value of 7 bar.
- Ensure that the installation complies with applicable legislation in terms of piping connection and materials, hygienic measures, testing and the possible required use of some specific components like thermostatic mixing valves, Differential pressure overflow valve, etc.
- The maximum water pressure is 3 bar (nominal opening pressure of the safety valve). Provide adequate reduction pressure device in the water circuit to ensure that the maximum pressure is NOT exceeded.
- Ensure that the drain pipes connected to the safety valve and to the air purger are properly driven or oriented to avoid water being in contact with unit components.
- Make sure that all field supplied components installed in the piping circuit can withstand the

water pressure and the water temperature range in which the unit can operate.

- YUTAKI units are conceived for exclusive use in a closed water circuit.
- The internal air pressure of the expansion vessel tank will be adapted to the water volume of the final installation (factory supplied with 0.1 MPa of internal air pressure).
- Drain taps must be provided at all low points of the installation to permit complete drainage of the circuit during servicing.

## 5.5.5 Anti-freezing protection for water circuit

### ◆ Anti-freezing protection

Frost can damage the system. To prevent components from freezing, software has been designed with special frost protection functions, that include the activation of pump & heater in case of low temperatures (see Service Manual Water pump control).

In case of a power supply failure, functions above cannot guarantee protection, allowing freezing and possible breakage of pipes and / or components. Due to that, an anti-freezing system (independent of power supply) is required:

- Adding glycol into the water circuit to lower the freezing point of water.
- Adding anti-freeze valves (field supplied)

#### CAUTION

*Both methods cannot be used simultaneously since glycol can leak out from valves to environment.*

## 5.5.6 Glycol as anti-freezing protection

Adding glycol into the water circuit to lower the freezing point of water.

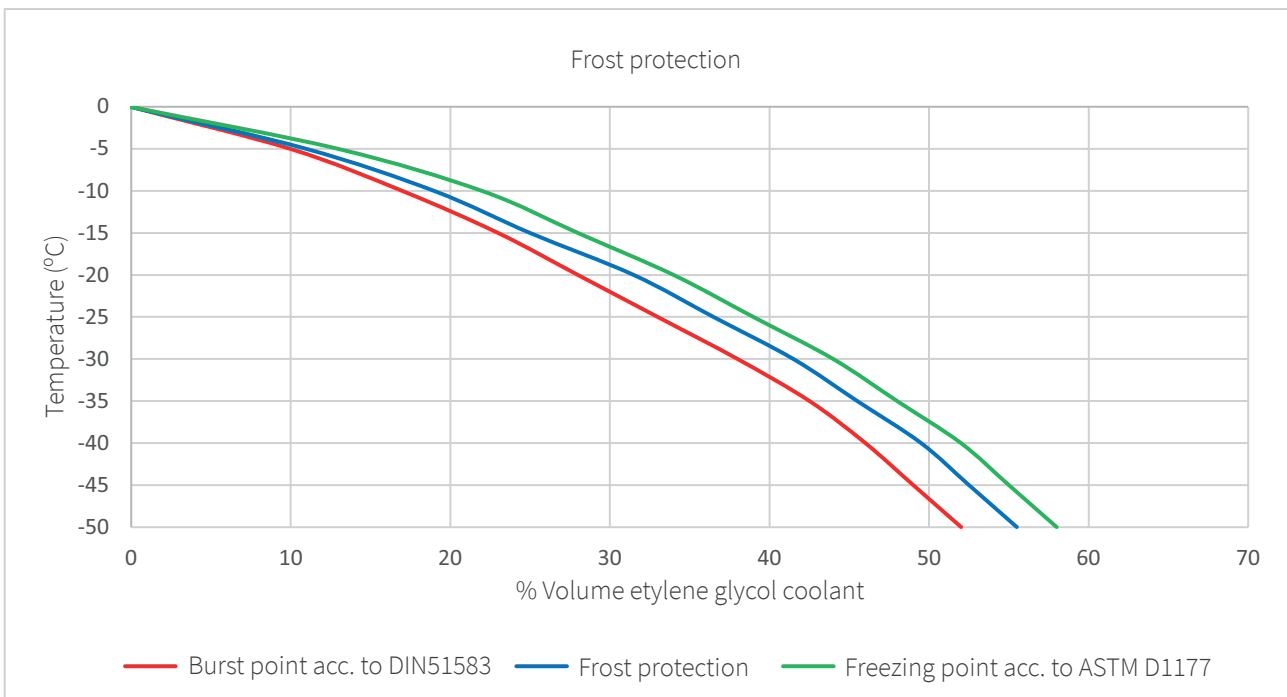
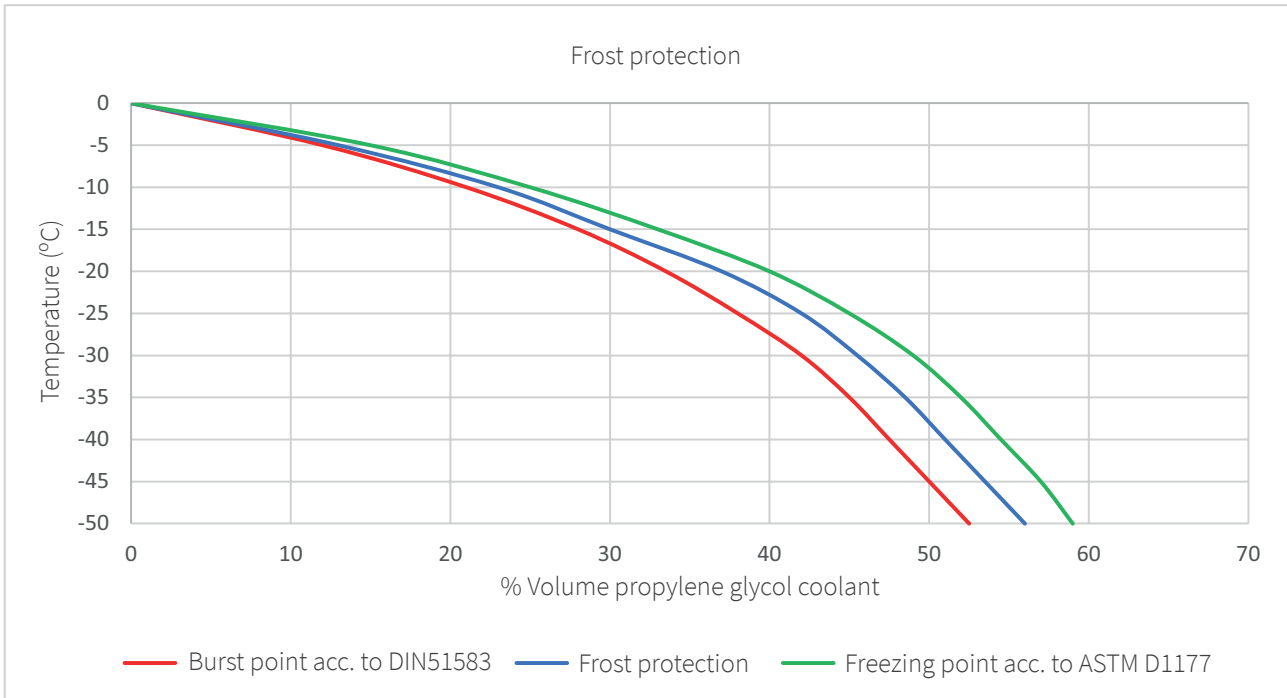
For YUTAKI systems, 2 types of glycols can be used: ethylene glycol & propylene glycol.

- Ethylene glycol is toxic. Consequently, its use is forbidden in systems that includes a domestic hot water tank.
- Propylene glycol (including necessary inhibitors, classified as Category III acc. To EN1717) can be used in all systems.

Required concentration depends on:

- The lowest expected outdoor temperature.
- Protection against bursting or freezing.

On graphic below, required concentration depending on outside temperature is shown.



***i* NOTE**

- Freezing point according to ASTM D 1177 is the temperature for the first ice crystal formation.
- The requirements of table must be always compared with glycol manufacturer specifications.
- Maximum concentration of glycol is 45%.
- If system is only prevented against bursting, pump must not be turned on (the liquid inside might be still frozen)

## CAUTION

- Do not add glycol that has been exposed to air as glycol absorbs water to the environment. Final glycol concentration can be lower than expected, allowing system to freeze up.
- Corrosion, that can damage gravely the system, is possible when glycol is added. Uninhibited glycol with oxygen can become acidic & attack metal surfaces, forming galvanic corrosion cells. The responsible installer must be a qualified water specialist & should decide which anti-freeze solution is necessary for each site's conditions. Corrosion inhibitors must be selected to counteract acids formed by glycol oxidation. Inhibitors with limited lifetime or containing silicates are forbidden. Galvanized pipes must be avoided since they can precipitate inhibitors. When using inhibitors, always follow manufacturer's instructions and ensure that the product is appropriate for materials used in water circuit.
- Adding glycol to water circuit reduces the maximum allowed water volume of the system and also capacity. Additional info can be found on Technical Catalogue.

### 5.5.7 Insulation

Water circuit piping must be insulated to prevent condensation and to reduce heat loss.

For outdoor water piping, recommended insulation thickness depends on piping length. Recommended thickness values for an insulation of  $\lambda=0.039\text{W/mK}$  are shown in table below.

Piping length (mm)	Minimum insulation thickness (mm)
<20	19
20 - 30	32
30 - 40	40
40-50	50

### 5.5.8 Water filling

- 1 Check that a water check valve (ATW-WCV-01 accessory) with a shut-off valve (field supplied) is connected to the water filling point (water inlet connection) for filling the space heating hydraulic circuit (see "5.2 Outdoor Unit Draining Operation").
- 2 Make sure all the valves are open (water inlet/outlet shut-off valves and the rest of valves of the space heating installation components).
- 3 Ensure that the air purgers of the unit and installation work correctly.
- 4 Connect a drain pipe to the safety valve and make sure that it is correctly connected to the general draining system. The safety valve is later used as an air purging device during the water filling procedure.
- 5 Fill the space heating circuit with water until the pressure displayed on the manometer reaches approximately 1.8 bar.

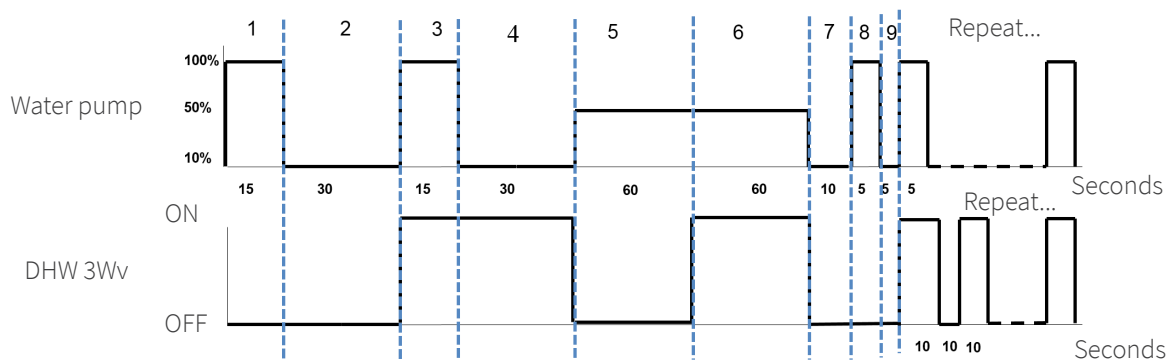
## NOTE

While the system is being filled with water, it is highly recommended to operate the safety valve



manually so as to help with the air purging procedure.

- 6 Remove as much air from inside the water circuit as possible through the air purger and other air vents in the installation (fan coils, radiators...).
- 7 Start the air purge procedure test. There are two modes (Manual or Automatic) which helps in case of installations with heating and DHW operation:
  - a. Manual: Start and stop the unit manually using the unit controller (Run/Stop button) and also using the DSW4 pin 2 of the PCB1 (ON: Forced to derive to DHW coil; OFF: Forced to derive to space heating).
  - b. Automatic: Select the air purge function using the user controller. When the automatic air purge function is running, the pump speed and the position of the 3-way valve (space heating or DHW) are automatically changed:



- 8 If a little quantity of air is still remaining in the water circuit, it should be removed by the manual air purger of the unit during the first hours of operation. Once the air in the installation has been removed, a reduction of water pressure in the circuit is very likely to occur. Therefore, additional water should be filled until water pressure returns to an approximate level of 1.8 bar.

## **i** NOTE

- The unit is equipped with a manual air purger (factory supplied) at the highest location of the unit. Anyway, if there are higher points in the water installation, air might be trapped inside water pipes, which could cause system malfunction. In that case, additional air purgers (field supplied) should be installed to ensure no air enters into the water circuit. The air vents should be located at points which are easily accessible for servicing.
- The water pressure indicated on the manometer may vary depending on the water temperature (the higher temperature, the higher pressure).
- Fill in the circuit with tap water. The water in the heating installation must comply with EN directive 98/83 EC. Non-sanitary controlled water is not recommended (for example, water from wells, rivers, lakes, etc.) (See “5.5.9 Water quality” section).
- The maximum water pressure is 3 bar (nominal opening pressure of the safety valve). Provide adequate reduction pressure device in the water circuit to ensure that the maximum pressure is NOT exceeded.
- For heating floor system, air should be purged by means of an external pump and an open

circuit to prevent the formation of air pockets.

- Check carefully for leaks in the water circuit, connections and circuit elements.

## 5.5.9 Water quality

### ◆ General recommendations for Primary (Space Heating/Cooling) and Secondary (DHW) circuit.

#### CAUTION

- Water quality must be according to EU council directive 98/83 EC.
- Water should be subjected to filtration or to a softening treatment with chemicals before application as treated water.
- It is also necessary to analyse the quality of water by checking pH, electrical conductivity, ammonia ion content, sulphur content, and others. If the results of the analysis are not good, the use of industrial water would be recommended.
- No antifreeze agent shall be added to the water circuit.
- To avoid deposits of scale on the heat exchangers surface it is mandatory to ensure a high water quality with low levels of  $\text{CaCO}_3$ .

Before water filling, sludge removal (for existing water networks), cleansing and rinsing (for an existing or new installations water networks) it is important to cleanse all hydraulic pipes to remove sludge and scale by using a specific designed product for cleaning central heating systems.

Also, its recommended to use a product inhibitor for protecting central heating systems against limescale and corrosion, always following manufacturer's instructions and ensuring that the product is suitable for the material used in the water network and the YUTAKI unit.

When using chemical treatments and inhibitors always follow manufacturer's instructions and ensure that the product is appropriate for the total water system. Using filling water that does not meet the stated quality requirements can cause a considerably reduce in service life. The responsibility will be out of Hitachi warranties.

The following water quality minimum requirement:

Parameter	Parametric Value	Unit
pH	6.5 to 8.5	-
Conductivity	10~500	$\mu\text{s}/\text{cm}$
Alkalinity	60~300	$\text{mg}/\text{l}$
Total Hardness	6 ~ 15	$^{\circ}\text{fH}$
	0.6~1.5	$\text{mmol}/\text{l}$
	60~150	$\text{mg CaCO}_3/\text{l}$
Chlorine	<50	$\text{mg Cl}^-/\text{l}$
Sulphate	<50	$(\text{mg SO}_4^{2-}/\text{l})$

Parameter	Parametric Value	Unit
Nitrate	< 100	mg/l (NO <sub>3</sub> )
Iron	< 0.2	mg/l (Fe)
TDS (Total dissolved solids)	8 ~ 400	ppm
Appearance of the water	Clear and without deposits	-

## ◆ Additional DHW Circuit recommendation

In places where possible hard water areas, to prevent and minimis scale situations, it is recommended to reduce stored water temperature to a maximum of 55°C, as huge scale quantity could damage the water tank and the electrical heater.

Flush the domestic water circuit with at least 10 times its volume of water. The life of the water tank will be shorter if groundwater (spring water, well water, etc..) is used without treatment which can lead to the corrosion of the tank. The water must not be aggressive or encrusting at any time. The result of calculating the Langelier Index should be between +/- 0.5.

In installation locations where the result of Langelier Index calculation are out of the expected value with a tendency to corrosive water, it is recommended to install the active anode accessory (ATW-CP-05 only available for YUTAKI H Combi version).

In the regions where the water is very hard (or out of requirements values) or where the result of Langelier Index calculation are out of expected value with a tendency to hard water, it is recommended fitting a softener system. Please ensure that softener system will be capable of providing effective protection against corrosion. It is recommended to install the active anode accessory (ATW-CP-05 only available for YUTAKI H Combi version).

As DHW Tank water is being used for storing drinking water, this water has to be in accordance with national regulations and Hitachi's quality minimum requirements. The use of softeners, active anodes or others protective systems will not bring a derogation from Hitachi's provided warranty.

## 5.6 Minimum water volume description

The following part shows how to calculate the minimum water volume in the system for product protection (anti-hunting) and temperature drop at defrosting.

MODEL		4HP	5HP	6HP	7HP
Minimum Volume *	L	55	55	55	55

### NOTE

(\*) Minimum volume is applicable for usual working conditions. If  $T_{wi}$  temperature during normal operation is below 25°C, the following steps must be applied to consider the defrost effect.

#### 1 Minimum required water volume during defrosting

The following formula is used to make the calculation:

Where:

$$V = \frac{360 \times Q_{DEF}}{\Delta T \times 4168.8} ; Q_{DEF} = Q_I + Q_Y$$

$V$  = Required water volume (m<sup>3</sup>)

The minimum volume of water needed in the installation to cover the heat loss caused by a reduction in the delivery water temperature during defrosting.

$\Delta T$  = Permissible water temperature drop (°C)

Drop in the delivery water temperature that the client is willing to allow in the installation.

$Q_{DEF}$  = Heat loss during defrosting (kW)

Heat loss caused in the system by reducing the delivery water temperature, which may affect the user's comfort level of warmth. This value is the sum of the two following items:

$Q_I$  = Heat demand from the installation (kW)

While defrosting is taking place, the unit is not providing the heat required to cover the heat demand from the installation. This value can be obtained in 2 ways:

1. By using the value of the energy demand from the installation, if known.
2. If this value is not known, it can be estimated by using the heating capacity of the unit at an air temperature of 0°C WB and a delivery water temperature at, for example, 45°C.

$Q_Y$  = Cooling load on the YUTAKI M / YUTAKI Hydrosplit unit (kW)

In addition to not providing the heat required to cover the heat demanded by the installation during defrosting, the unit is also producing cold. It can be estimated that this

value is approximately 85% of the heating capacity on the unit under standard conditions (air temperature: 6/7°C (WB/DB) and input/output temperature of the water: 40 / 45°C)

***i*** NOTE

*The maximum time for defrosting considered is 6 minutes per hour.*

The following table shows the minimum water volume needed in each unit.

	11	12	13	16
Water temperature drop	Volume (L)			
5°C	350	382	414	510
10°C	175	191	207	255
15°C	117	127	138	170
20°C	88	96	104	127
25°C	70	76	83	102
30 °C	58	64	69	85

***i*** NOTE

- *The values shown on the table are based on theoretical installation conditions. In addition YUTAKI units admits several hydraulic circuits configurations, and the value can be different depending on each specific installation.*
- *Therefore, it rests with the client to recalculate these values depending on the real conditions of the installation.*

## 5.7 Water piping

### 5.7.1 Water piping length

Consider the following guidelines when designing the water circuit.

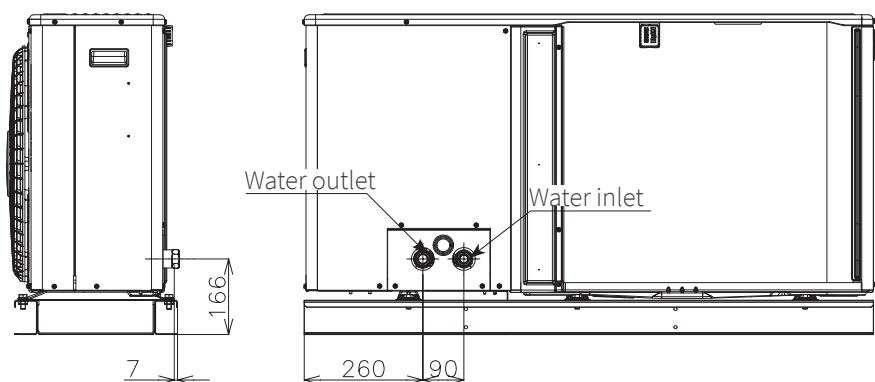
Item	YUTAKI HYDROSPLIT R32	
	YUTAKI H	YUTAKI H Combi
Maximum water piping length between indoor unit and DHW tank	10 m	-
Maximum water piping length between indoor unit and 3-way valve	3 m	-
Maximum water piping length between 3-way valve and DHW tank	10 m	-
Minimum water piping length between YUTAKI Hydrosplit and YUTAKI H or YUTAKI H Combi	5 m	5 m

Item	YUTAKI M R32
Maximum water piping length between indoor unit and DHW tank	10 m
Maximum water piping length between 3-way valve and DHW tank	10 m
Maximum total piping combination	10 m

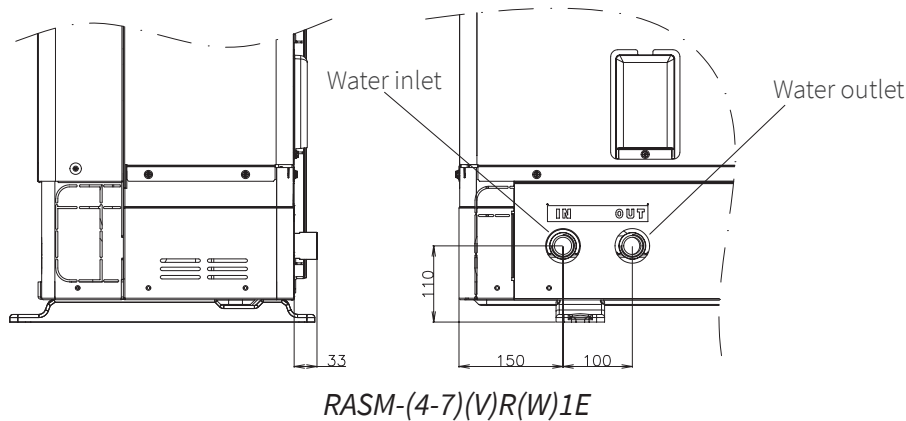
### 5.7.2 Water piping size

#### ◆ Piping location

The unit is factory supplied with two unions to be connected to the water inlet/outlet pipe. Refer to the next figure detailing the location of the water pipes location.



RASM-(2/3)VRE



## ◆ Piping size

Model	Space heating pipes connection		
	Inlet connection	Outlet connection	Shut-off valves (Field-supplied)
2.0 HP	G 1" (female)	G 1" (female)	G 1" (male) - G 1" (male)
3.0 HP	G 1" (female)	G 1" (female)	G 1" (male) - G 1" (male)
4.0 HP	G 1-1/4" (female)	G 1-1/4" (female)	G 1-1/4" (male) - G 1-1/4" (male)
5.0 HP	G 1-1/4" (female)	G 1-1/4" (female)	G 1-1/4" (male) - G 1-1/4" (male)
6.0 HP	G 1-1/4" (female)	G 1-1/4" (female)	G 1-1/4" (male) - G 1-1/4" (male)
7.0 HP	G 1-1/4" (female)	G 1-1/4" (female)	G 1-1/4" (male) - G 1-1/4" (male)

(inches)

## 5.8 Suspension of water piping

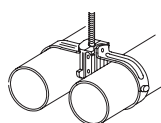
Suspend the water piping at certain points and prevent the water piping from being in direct contact with the building: walls, ceilings, etc...

If there is direct contact between pipes, abnormal sound may occur due to the vibration of the piping. Pay special attention in cases of short piping lengths.

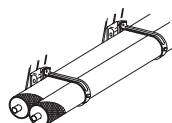
Do not fix the water pipes directly with the metal fittings (piping may expand and contract).

Some examples for suspension method are shown below.

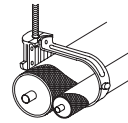
For suspending heavies



For piping along the wall



For instant installation work



## Electrical and control settings

6.1	Optional unit wiring for accessories .....	66
6.1.1	Summary of the terminal board connections.....	66
6.1.2	Input terminals (Default input functions) .....	70
6.2	Setting of DIP switches and RSW switches.....	80
6.2.1	Refrigerant cycle PCB.....	83
6.2.1.1	DSW1 .....	83
6.2.1.2	DSW2.....	84
6.2.1.3	DSW3.....	85
6.2.1.4	DSW4 / RSW1.....	86
6.2.1.5	DSW5.....	86
6.2.1.6	DSW6.....	87
6.2.1.7	DSW7.....	87
6.2.1.8	DSW301 .....	88
6.2.1.9	DSW302 .....	88
6.2.1.10	LED indication.....	89
6.2.2	Water cycle PCB.....	90
6.2.2.1	DSW1.....	90
6.2.2.2	DSW2.....	90
6.2.2.3	DSW3.....	91
6.2.2.4	DSW4.....	91
6.2.2.5	DSW5.....	93
6.2.2.6	DSW6 (only if available).....	93
6.2.2.7	DSW7.....	94
6.2.2.8	DSW15 & RSW2 .....	94

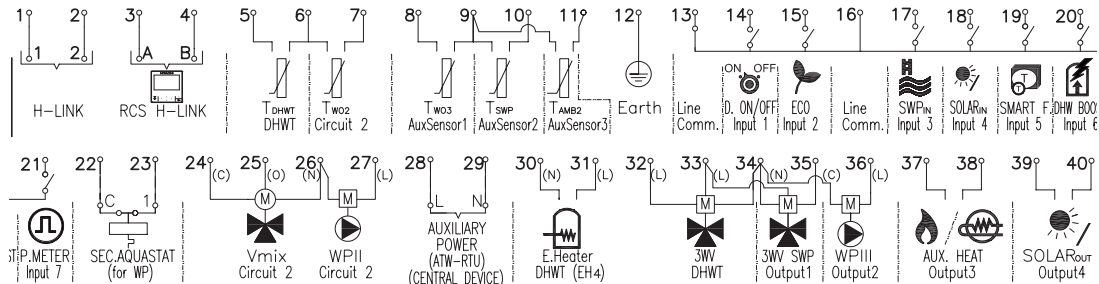


6.2.2.9 DSW16 & RSW1 .....	94
6.2.2.10 DSW18 .....	95
6.2.2.11 SSW1.....	95
6.2.2.12 SSW2.....	95
6.2.2.13 LED indication.....	96

## 6.1 Optional unit wiring for accessories

### 6.1.1 Summary of the terminal board connections

#### RASM-(2-3)VRE, RASM-(4-7)(V)R(W)1E and HWM-WE



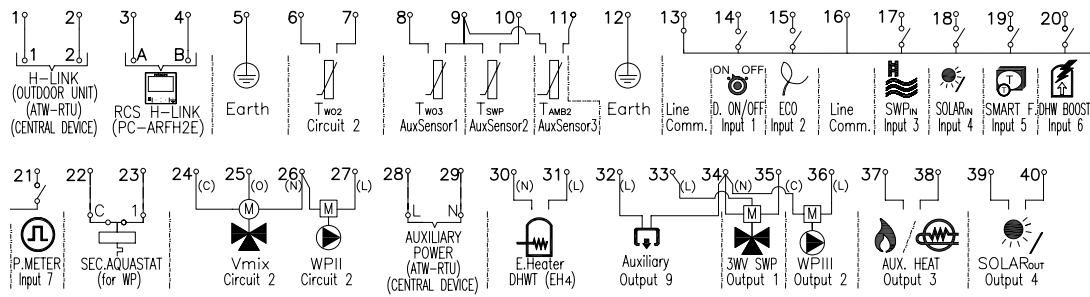
Mark	Part name	Description
<b>TERMINAL BOARD 1 (TB1)</b>		
N	~ 230V 50Hz	
L1		Main power supply connection
L2		
L3		
<b>TERMINAL BOARD 2 (TB2)</b>		
1	H-LINK communication	The H-LINK transmission has to be done between the indoor unit and the terminals 1-2 of either outdoor unit, ATW-RTU or any other central device.
2	H-LINK communication	
3	H-LINK communication for remote control switch	Terminals for the connection of the YUTAKI unit controller.
4		
5	DHW tank's thermistor	The DHW sensor is used to control the temperature of the domestic hot water tank.
6	Common thermistor	Common terminal for thermistor.
7	Thermistor for water outlet temperature of second cycle	The sensor is used for the second temperature control and should be positioned after the mixing valve and the circulation pump.
8	Thermistor for water outlet temperature of third cycle	The sensor is used for the third temperature control and should be positioned after the hydraulic separator, buffer tank or boiler combination.
9	Common thermistor	Common terminal for thermistors.
10	Thermistor for swimming pool water temperature	The sensor is used for the swimming pool temperature control and should be positioned inside plate heat exchanger of the swimming pool.
11	Thermistor for second ambient temperature	The sensor is used for the second ambient temperature control and it should be positioned outdoors.
12	Earth	Earth connection for the 3 way valve and water pump.
13	Common line	Terminal Line common for input 1 and input 2.
14	Input 1 (Demand ON/OFF) (*)	The air to water heat pump system has been designed to allow the connection of a remote thermostat to effectively control your home's temperature. Depending on the room temperature, the thermostat will turn the air to water heat pump system ON and OFF.
15	Input 2 (ECO mode) (*)	Available signal which allows to reduce the water setting temperature of circuit 1, circuit 2 or both.
16	Common line	Terminal Line common for inputs 3, 4, 5, 6, 7.
17	Input 3 (Swimming pool) (*)	Only for swimming pool installations: It is necessary to connect an external input to the air to water heat pump to provide signal when the water pump of swimming pool is ON.

Mark	Part name	Description
18	Input 4 (Solar) (*)	Available input for Solar combination with Domestic Hot Water Tank.
19	Input 5 (Smart function) (*)	For the connection of an external tariff switch device to switch OFF the heat pump during peak electricity demand period. Depending on the setting, the heat pump or DHWT will be blocked when signal is open/closed.
20	Input 6 (DHW boost) (*)	Available input for an instantaneous heating of the domestic hot water of the tank.
21	Input 7 (Power meter)	The measuring of the real power consumption can be done connecting an external power meter. The number of pulses of the power meter is a variable which must be set. By this, every pulse input is added into corresponding operation mode (Heating, Cooling, DHW Operation). Two possible options: - One power meter for all installation (IU+OU). - Two separated power meters (one for IU and one for OU).
22	Aquastat security for circuit 1	Terminals intended for the connection of the Aquastat security accessory (ATW-AQT-01) for controlling water temperature of the circuit 1.
23	(WP1)	
24(C)	Mixing valve close	When a mixing system is required for a second temperature control, these outputs are necessary to control the mixing valve.
25(O)	Mixing valve open	
26(N)	Common line	Terminal line common for mixing valve and water pump 2.
27(L)	Water Pump 2 (WP2)	When there is a second temperature application, a secondary pump is the circulating pump for the secondary heating circuit.
28	Auxiliary power	Power supply for ATW-RTU and central device
29		
30(N)	Electrical Heater DHW Output	If DHW tank contains an electric heater, the air to water heat pump can activate it if the heat pump cannot achieve the required DHW temperature by itself.
31(L)		
32(C)	3-way valve for DHW tank	The air to water heat pump can be used to heat DHW. This output will be ON when DHW is activated.
33(L)	Line	Line terminal for the 3-way valve for DHW tank and swimming pool.
34(N)	Common line	Terminal line common for 3-way valve of DHW tank and outputs 1 and 2.
35(C)	Output 1 (3-way valve for swimming pool) (*)	The air to water heat pump can be use to heat swimming pool. This output will be ON when swimming pool is activated.
36(L)	Output 2 (Water pump 3 (WP3)) (*)	When there is a hydraulic separator or buffer tank, additional water pump (WP3) is needed.
37	Output 3 (Auxiliary boiler or electric heater) (*)	The boiler can be used to alternate with the heat pump when the heat pump cannot achieve the required temperature by itself.
38		A water electric heater (as accessory) can be used to provide the additional heating required on the coldest days of the year.
39	Output 4 (Solar) (*)	Output for solar combination with Domestic Hot Water Tank.
40		

## NOTE

(\*): Inputs and outputs explained in the table are the factory-set options. By means of the unit controller, some other inputs and outputs functions can be configured and used. Please, refer to the Service Manual for detailed information.

## HWD-WE-220S(-K)



Mark	Part name	Description
<b>TERMINAL BOARD 1 (TB1)</b>		
N	~ 230V 50Hz	
L1		Main power supply connection
L2		
L3		
<b>TERMINAL BOARD 2 (TB2)</b>		
1	H-LINK communication	The H-LINK transmission has to be done between the indoor unit and the terminals 1-2 of either outdoor unit, ATW-RTU or any other central device.
2	H-LINK communication	
3	H-LINK communication for remote control switch	Terminals for the connection of the YUTAKI unit controller.
4	Earth	Earth connection for accessories.
5	Common thermistor	Common terminal for thermistor.
6	Thermistor for water outlet temperature of second cycle	The sensor is used for the second temperature control and should be positioned after the mixing valve and the circulation pump.
7	Thermistor for water outlet temperature of third cycle	The sensor is used for the third temperature control and should be positioned after the hydraulic separator, buffer tank or boiler combination.
8	Common thermistor	Common terminal for thermistors.
9	Thermistor for swimming pool water temperature	The sensor is used for the swimming pool temperature control and should be positioned inside plate heat exchanger of the swimming pool.
10	Thermistor for second ambient temperature	The sensor is used for the second ambient temperature control and it should be positioned outdoors.
11	Earth	Earth connection for the 3 way valve and water pump.
12	Common line	Terminal Line common for input 1 and input 2.
13	Input 1 (Demand ON/OFF) (*)	The air to water heat pump system has been designed to allow the connection of a remote thermostat to effectively control your home's temperature. Depending on the room temperature, the thermostat will turn the air to water heat pump system ON and OFF.
14	Input 2 (ECO mode) (*)	Available signal which allows to reduce the water setting temperature of circuit 1, circuit 2 or both.
15	Common line	Terminal Line common for inputs 3, 4, 5, 6, 7.
16	Input 3 (Swimming pool) (*)	Only for swimming pool installations: It is necessary to connect an external input to the air to water heat pump to provide signal when the water pump of swimming pool is ON.
17	Input 4 (Solar) (*)	Available input for Solar combination with Domestic Hot Water Tank.
18	Input 5 (Smart function) (*)	For the connection of an external tariff switch device to switch OFF the heat pump during peak electricity demand period. Depending on the setting, the heat pump or DHWT will be blocked when signal is open/closed.
19	Input 6 (DHW boost) (*)	Available input for an instantaneous heating of the domestic hot water of the tank.

Mark	Part name	Description
21	Input 7 (Power meter)	The measuring of the real power consumption can be done connecting an external power meter. The number of pulses of the power meter is a variable which must be set. By this, every pulse input is added into corresponding operation mode (Heating, Cooling, DHW Operation). Two possible options: - One power meter for all installation (IU+OU). - Two separated power meters (one for IU and one for OU).
22	Aquastat security for circuit 1	Terminals intended for the connection of the Aquastat security accessory (ATW-AQT-01) for controlling water temperature of the circuit 1.
23	(WP1)	
24(C)	Mixing valve close	When a mixing system is required for a second temperature control, these outputs are necessary to control the mixing valve.
25(O)	Mixing valve open	
26(N)	Common line	Terminal line common for mixing valve and water pump 2.
27(L)	Water Pump 2 (WP2)	When there is a second temperature application, a secondary pump is the circulating pump for the secondary heating circuit.
28	Auxiliary power	Power supply for ATW-RTU and central device
29		
30(N)	Electrical Heater DHW Output	If DHW tank contains an electric heater, the air to water heat pump can activate it if the heat pump cannot achieve the required DHW temperature by itself.
31(L)		
32	Output 9	Line terminal for valve accessories
33(L)	Line	
34(N)	Common line	Terminal line common for outputs 1, 2 and 9.
35(C)	Output 1 (3-way valve for swimming pool) (*)	The air to water heat pump can be use to heat swimming pool. This output will be ON when swimming pool is activated.
36(L)	Output 2 (Water pump 3 (WP3)) (*)	When there is a hydraulic separator or buffer tank, additional water pump (WP3) is needed.
37	Output 3 (Auxiliary boiler or electric heater) (*)	The boiler can be used to alternate with the heat pump when the heat pump cannot achieve the required temperature by itself.
38		A water electric heater (as accessory) can be used to provide the additional heating required on the coldest days of the year.
39	Output 4 (Solar) (*)	Output for solar combination with Domestic Hot Water Tank.
40		

## NOTE

(\*): Inputs and outputs explained in the table are the factory-set options. By means of the unit controller, some other inputs and outputs functions can be configured and used. Please, refer to the Service Manual for detailed information.

## 6.1.2 Input terminals (Default input functions)

### ◆ Room thermostat communication cables

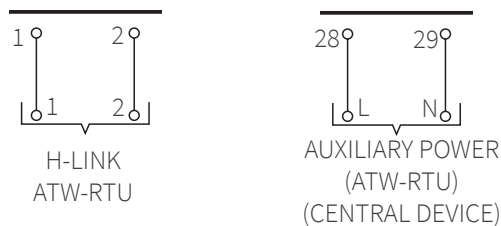
There are two different room thermostat types as accessory

#### **Optional wireless intelligent room thermostat (TB2) ATW-RTU**

Only for wireless room thermostat accessory: the receiver is connected to the polarity-free terminals 1 and 2.

The Wireless room thermostat and the Intelligent receiver are already configured to communicate with each other. If the Wireless room thermostat or the Intelligent receiver is replaced or an additional second temperature circuit thermostat is added, it is necessary to rebind them as explained in the manual of the Wireless intelligent room thermostat.

The Intelligent receiver is connected to the indoor unit table board as shown in the next picture:



#### **Optional wireless ON/OFF room thermostat ATW-RTU-04**

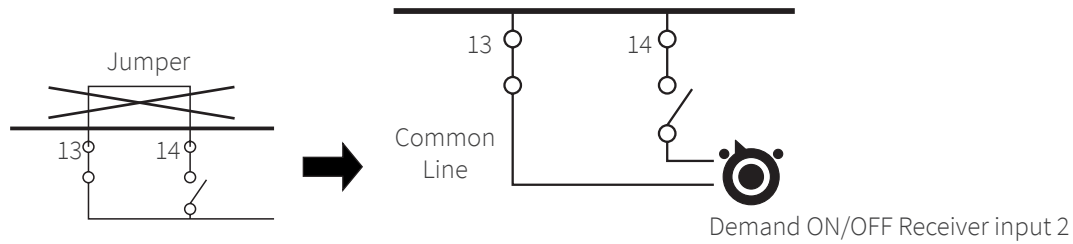
The heat pump system has been designed to allow the connection of a remote ON/OFF thermostat to effectively control the home temperature. Depending on the room temperature, the thermostat will turn the system to ON or OFF.

a. If no thermostat is installed

Terminals 13 and 14 are jumped if there is no ON/OFF receiver connected (Only applicable for YUTAKI M RASM-(2/3)VRE). When no remote thermostat is installed the operating condition for the unit (Thermo ON/OFF) will be controlled by the water calculation control system.

b. Installation of the ATW-RTU-04

In case of setting an installation with 2 circuits (circuit 1 and circuit 2) and the same demand ON/OFF is used for both of them, remove the jumper between terminals 13 and 14 (Only applicable for YUTAKI M RASM-(2/3)VRE) of the Terminal board 2 and connect the RF receiver as shown in the following picture.



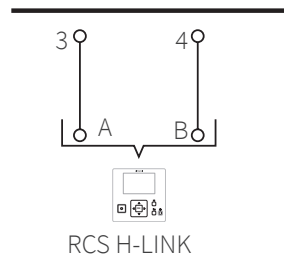
Thermostat requirements:  
 Power supply: 230V AC  
 Contact voltage: 230V

## **i** NOTE

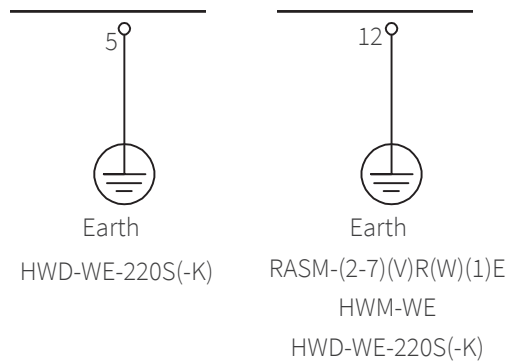
- If wireless intelligent thermostat is selected, optional ON/OFF thermostat has no effect.
- Set the configuration in the user's control.
- In case of setting an installation with 2 circuits (Circuit 1 and Circuit 2) and a different Demand ON/OFF is used for each of them, please refer to "6.1.2 Input terminals (Default input functions)" section in this chapter.
- Auxiliary power supply is available for thermostats and central devices (28 and 29 terminals of TB2).

## ◆ Unit controller connection

In those cases where the unit controller is ordered as a required accessory, or those cases where another unit controller must be connected as a second thermostat, the connections between unit controller and the indoor unit must be done in terminals 3 and 4, as it is shown in the next picture:

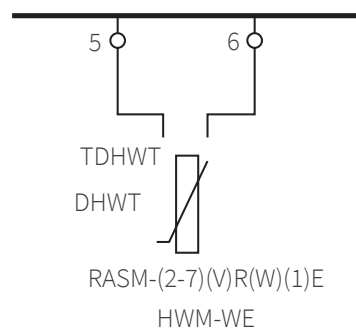


## ◆ Earth



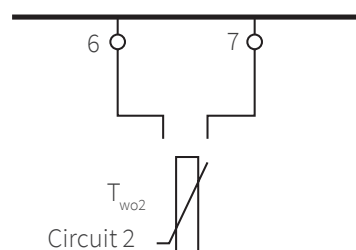
## ◆ DHWT Thermistor (TDHWT)

For those cases in which a tank is installed as accessory, a thermistor must be installed to control the water temperature. The connection for this thermistor must be done between terminals 5 and 6 of the TB2 (Not available for HWD-WE-220S(-K)).



## ◆ Water outlet thermistor for circuit 2 (TWO2)

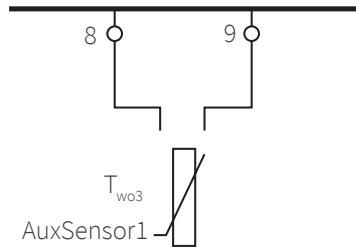
When the installation is configured with a second circuit the thermistor for the water outlet temperature have to be connected between terminals 6 and 7 of the terminal board 2.





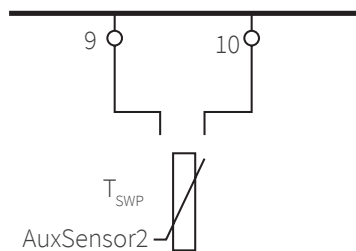
## ◆ Water outlet thermistor for circuit 3 (TWO3)

When the installation is configured with a third circuit the thermistor for the water outlet temperature have to be connected between terminals 8 and 9 of the terminal board 2.



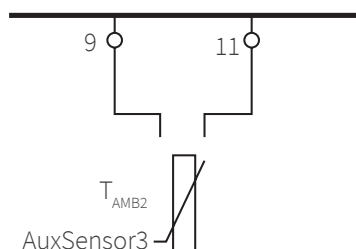
## ◆ Swimming pool water temperature thermistor (TSWP)

To control the swimming pool temperature. The thermistor should be positioned inside plate heat exchanger of the swimming pool and have to be connected between terminals 9 and 10 of the terminal board 2.



## ◆ Second ambient temperature thermistor (TAMB2)

To control the second ambient temperature. The thermistor should be positioned outdoors and have to be connected between terminals 9 and 11 of the terminal board 2.

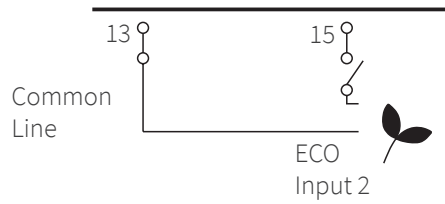


## ◆ ECO (Default for input 2)

When enabled at Unit controller, both for circuit 1 and circuit 2, also for heating and cooling, this input switches the indoor unit into an ECO mode by adjusting its settings only when input is closed.

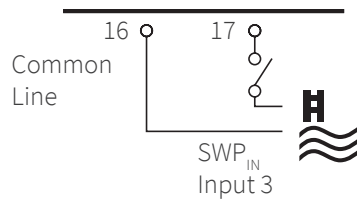
The input can come from a push button, a thermostat or any other external device with that

purpose.



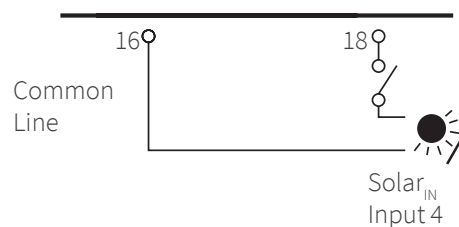
## ◆ Swimming pool (Default for input 3)

When it is necessary to control the temperature of the swimming pool water, a connection between the heat pump and the corresponding sensor must be done on terminals 16 and 17 at the Terminal board (input 4).



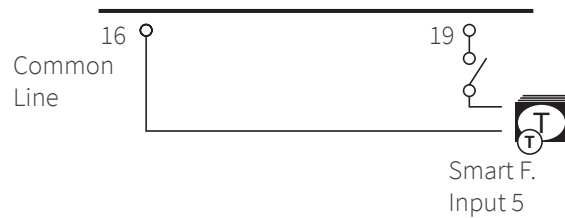
## ◆ Solar (Default for input 4)

This input comes from a solar panel sensor. The solar combination by input demand allows HSW to be heated by solar system when there is enough solar energy available. The connection of this input signal has to be done between terminals 16 and 18 at TB2.



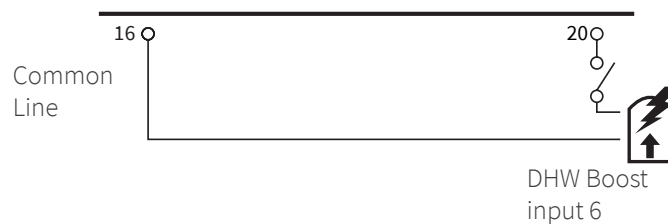
## ◆ Smart tariff (Default for input 5)

This function can be used to block or limit the heat pump. It allows an external Smart switch device to switch off or limit the heat pump during a period of peak electricity demand. Terminals 16 and 19 of the TB2.



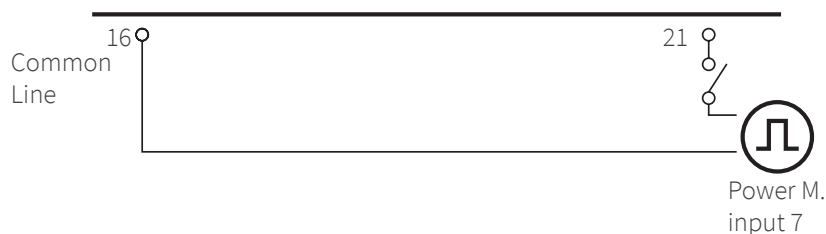
## ◆ DHW boost (Default for input 6)

This function allows a request for a one-time heating up of the domestic hot water temperature. The input can be sent by a push button, a NC contact and a NO contact. This input is switched on terminals 16 and 20 of the TB2.



## ◆ Power Meter (Default for input 7)

This function is used to monitor real consumption of the system by means an external power meter device connected at this input. The calculation method is done by measuring real consumption of the whole installation with one power meter device or 2 separate power meter (one for indoor unit and another one for outdoor unit).

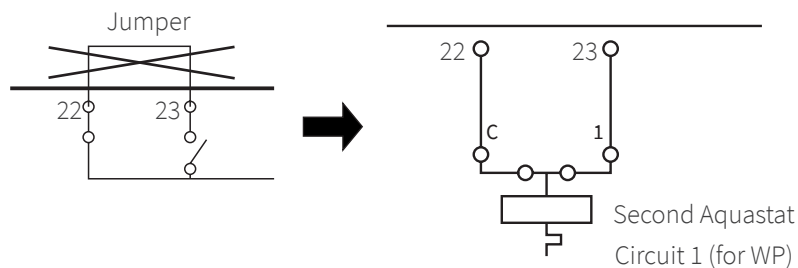


## ◆ Aquastat for circuit 1

Aquastat is a security accessory to control in order to prevent high water temperature entering into floor system (Circuit 1). This devices must be connected to terminals 22 & 23 for circuit 1.

When this devices is activated because of the high temperature of the water, it stops the water pump in order to stop the flow of water to the heating floor.

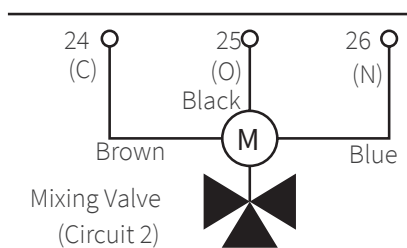
Terminals 22 and 23 are jumped if there is no Aquastat connected. In case of setting an installation with Aquastat, remove the jumper between terminals 22 and 23 of the Terminal board 2 and connect the Aquastat as shown in the following picture.



## Output terminals (Default output functions)

### ◆ Mixing valve for Circuit 2

The mixing valve is controlled to maintain the second heating temperature at the second heating temperature set point. The control system decides how much to open or close the mixing valve to achieve the desired position of the valve.



Terminal	Name	Description
24	C	Close
25	O	Open
26	N	Neutral

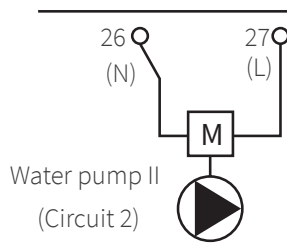
Valve requirements:

Power supply: 230V AC 50Hz

Maximum running current: 100mA

## ◆ Water pump 2 Circuit 2

In case of a second circuit installation (second temperature level) the secondary pump is the circulating pump for the second heating temperature.



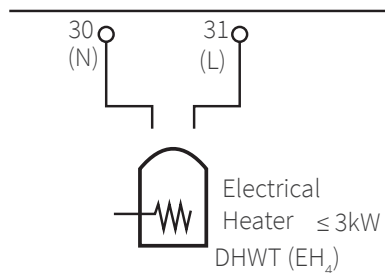
Pump requirements:

Power supply: 230V AC 50Hz

Maximum running current: 500mA (An auxiliary relay must be installed in case of high consumption of the water pump).

## ◆ Electrical heater DHWT output

In those cases where a DHW tank is installed with an electrical heater, the Air to Water heat pump can activate the electric heater of the tank when the heat pump cannot achieve the required DHW temperature by itself.

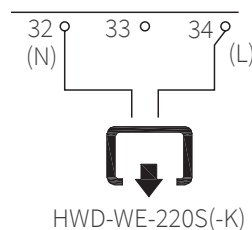


### ⚠ CAUTION

When using a DHW tank other than those from Hitachi, the maximum connectable heater load is 3 kW (connected to TB2 terminals 30-31).

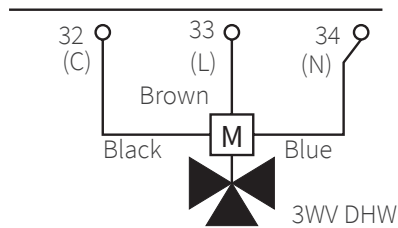
## ◆ Output 9

This output has no pre-set configuration. By means of the LCD it can be configured with any of the options offered inside I/O and sensor menu.



## ◆ 3 Way valve for DHW tank output

YUTAKI units can be used to heat DHW. The signal is used on a 3-way motorized diverting valve and to provide control of supply water flow (water flow for space heating when there is no signal, and water flow for DHW when signal is ON)



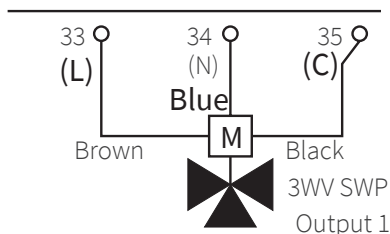
Valve requirements:  
Power supply: 230V AC 50Hz  
Maximum running current: 100mA

### Output terminals (Optional output functions)

## ◆ 3 Way valve for Swimming pool (Default for Output 1)

YUTAKI units can be used to heat the water of a swimming pool. The signal is used on a 3-way motorized diverting valve and to provide control of supply water flow for the swimming pool. This output is available when the function is enabled from the Unit controller.

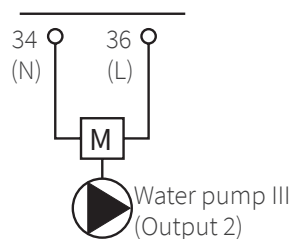
Using the appropriate wiring, connect the valve cables as shown in the previous picture.



Valve requirements:  
Power supply: 230V AC 50Hz  
Maximum running current: 100mA

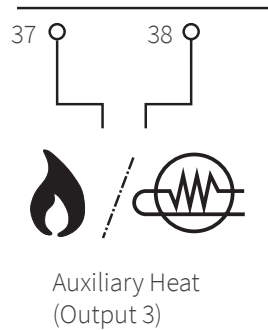
## ◆ Water pump 3 (Default for Output 2)

When the boiler is configured with the heat pump or needs an additional pump for the system, a hydraulic separator or buffer tank must be used to ensure a correct hydraulic balance



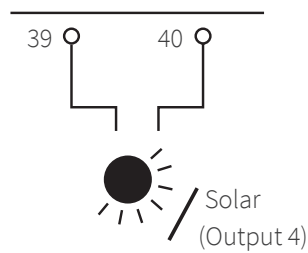
## ◆ Auxiliary boiler or heater (Default for Output 3)

The auxiliary boiler or heater can be used when the heat pump cannot achieve the require temperature by itself.



## ◆ Solar (Default for output 4)

This output is used when solar mode is enabled (from Unit controller) and the temperature in the solar panel rises above the water temperature in the domestic hot water tank (DHWT). The connection between terminals 39 and 40 shall be closed in order to activate the dedicated water pump for solar panel combination.



## 6.2 Setting of DIP switches and RSW switches

### NOTE

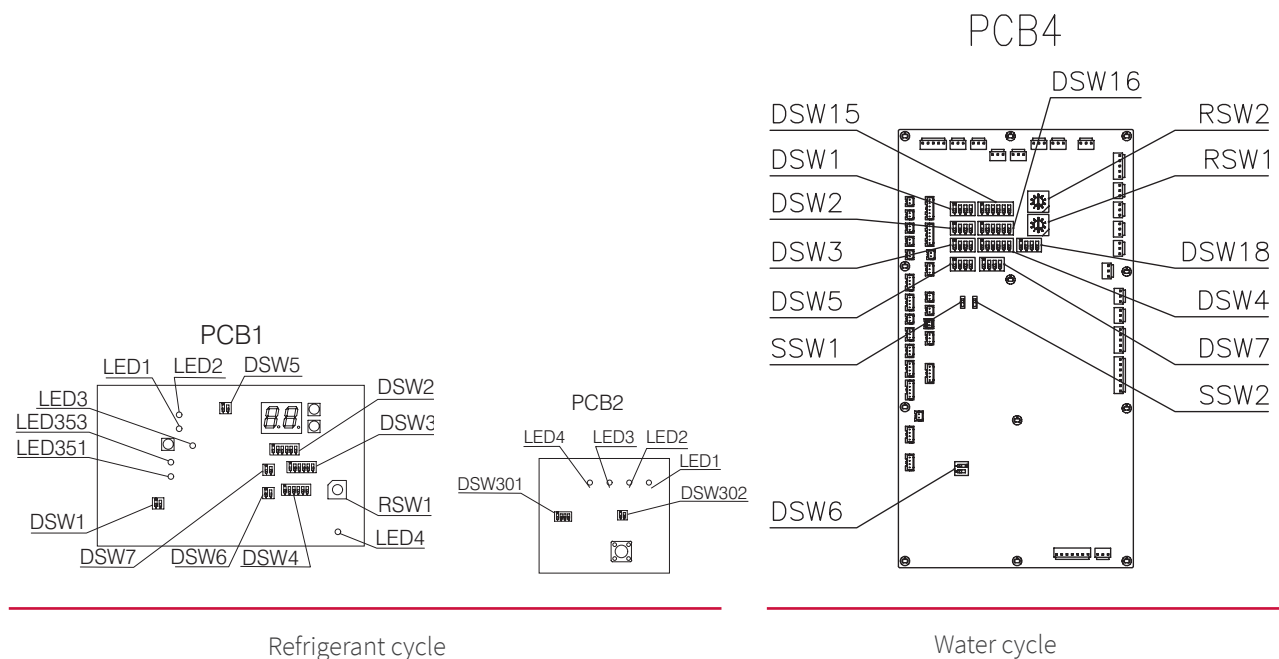
- The mark “■” indicates the DIP switches positions.
- No mark “■” indicates pin position is not affected.
- The figures show the settings before shipment or after selection.
- “Not used” means that the pin must not be changed. A malfunction might occur if changed.

### CAUTION

Before setting DIP switches, first turn the power supply OFF and then set the position of DIP switches. If the switches are set without turning the power supply OFF, the contents of the setting are invalid.

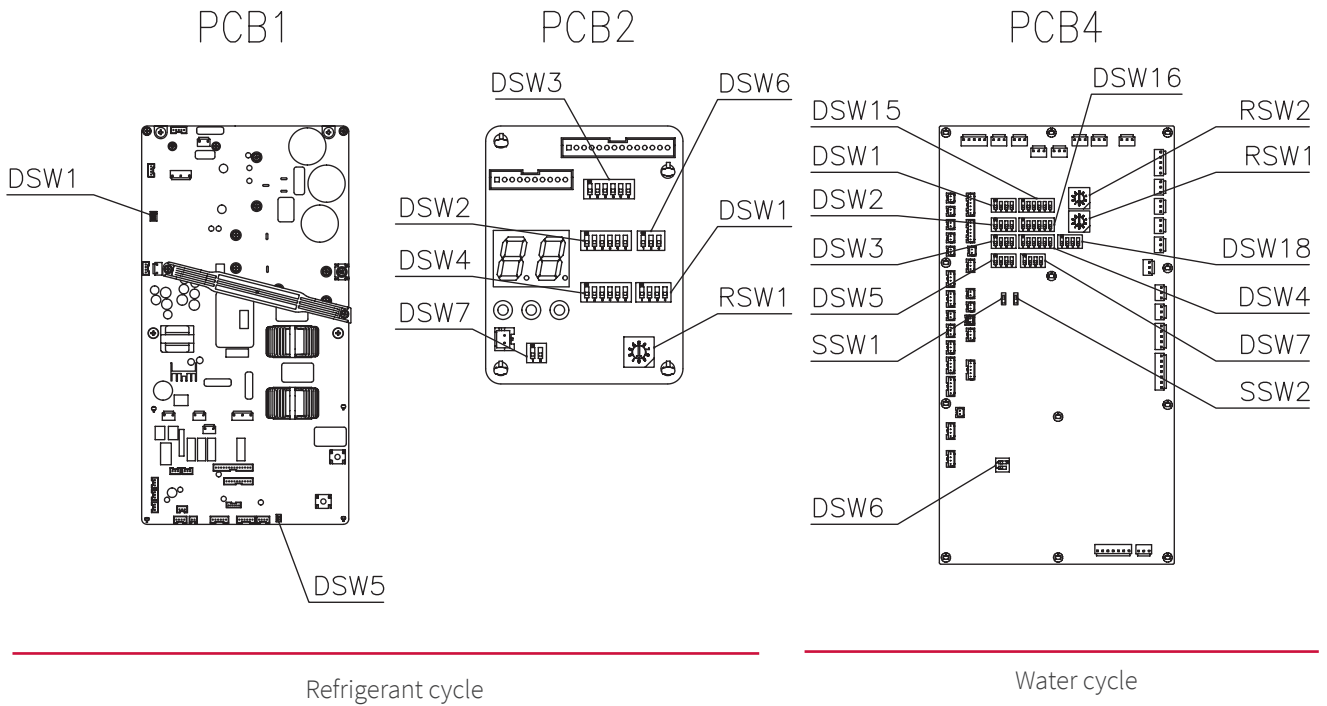
The PCB in the outdoor unit is operating with DIP switches and push switches. The location is as follows:

### **YUTAKI M - RASM-(2-3)VRE (~230V 50Hz)**

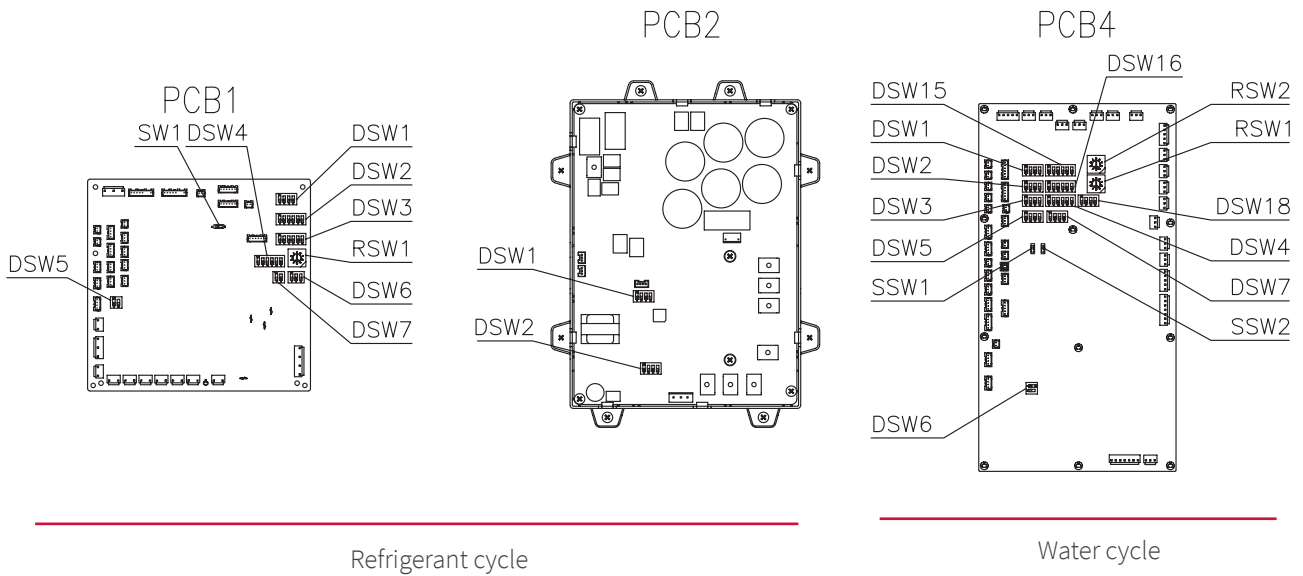




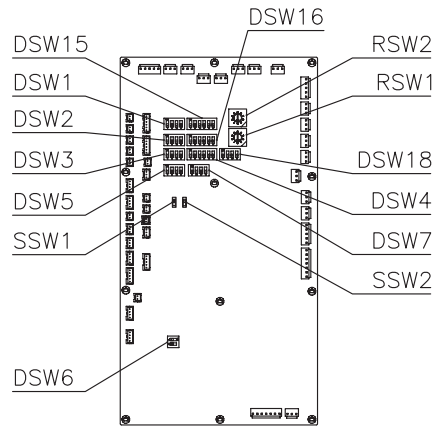
## YUTAKI M / YUTAKI Hydrosplit R32 - RASM-(4-6)VR(W)1E (~230V 50Hz)



## YUTAKI M / YUTAKI Hydrosplit R32 - RASM-(4-7)R(W)1E (3N~ 400V 50Hz)



## YUTAKI H / H Combi - HWM-WE / HWD-WE-220S(-K)



Water cycle

## 6.2.1 Refrigerant cycle PCB






### 6.2.1.1 DSW1

#### ◆ Cancellation of electric current detection

RASM-(2/3)VRE: PCB1

RASM-(4-6)VR(W)1E: PCB1

RASM-(4-7)R(W)1E: PCB2

DSW1	RASM-(2/3)VRE	RASM-(4-6)VR(W)1E	RASM-(4-7)R(W)1E
Factory setting			
When set pin to ON, the electric current detection is cancelled. Pin should be set back to OFF after electrical work.			Not applicable

#### ◆ Test run mode

RASM-(4-6)VR(W)1E: PCB2

RASM-(4-7)R(W)1E: PCB1

DSW1	RASM-(4-7)(V)R(W)1E
Factory setting	
Test run for pump down	
Not available	
Not available	
Not available	
Forced stoppage of compressor	

**i NOTE**

- This operation is reset once the compressor is in Thermo-ON mode.
- During the test run operation the units will operate continuously during 2 hours without Thermo-OFF and the 3-minute guard for compressor protection will be effective.
- Test run will start within 20 seconds after setting DSW1 pin 1 to ON position.

## 6.2.1.2 DSW2

### ◆ Optional Function setting

RASM-(2/3)VRE: PCB1

RASM-(4-6)VR(W)1E: PCB2

RASM-(4-7)R(W)1E: PCB1

DSW2	RASM-(2/3)VRE	RASM-(4-7)(V)R(W)1E
Factory setting		
Function selection setting mode		
External input, output setting mode		

### ◆ Not used

RASM-(4-7)R(W)1E: PCB2

DSW2	RASM-(4-7)R(W)1E
Factory setting	

## 6.2.1.3 DSW3

### ◆ Capacity Setting (No setting is required)

RASM-(2/3)VRE: PCB1

RASM-(4-6)VR(W)1E: PCB2

RASM-(4-7)R(W)1E: PCB1

DSW3	Factory setting
RASM-2VRE	
RASM-3VRE	
RASM-4VR(W)1E	
RASM-5VR(W)1E	
RASM-6VR(W)1E	
RASM-4R(W)1E	
RASM-5R(W)1E	
RASM-6R(W)1E	
RASM-7R(W)1E	

### NOTE

For RASM-7R(W)1E DSW6 must be configured to PIN 1 ON (factory setting, do not change).

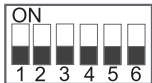

## 6.2.1.4 DSW4 / RSW1

### ◆ Refrigerant cycle selection (No setting is required)

RASM-(2/3)VRE: PCB1

RASM-(4-6)VR(W)1E: PCB2

RASM-(4-7)R(W)1E: PCB1

DSW4 / RSW1	RASM-(2-7)(V)R(W)(1)E
Factory setting	 





## 6.2.1.5 DSW5

### ◆ Terminal resistance

RASM-(2/3)VRE: PCB1

RASM-(4-6)VR(W)1E: PCB1

RASM-(4-7)R(W)1E: PCB1

DSW5	RASM-(2/3)VRE	RASM-(4-6)VR(W)1E	RASM-(4-7)R(W)1E
Factory setting			
Fuse recovery	Not applicable	Not applicable	




## 6.2.1.6 DSW6

### ◆ No setting is required

RASM-(2/3)VRE: PCB1

RASM-(4-6)VR(W)1E: PCB2

RASM-(4-7)R(W)1E: PCB1

DSW6	RASM-(2/3)VRE	RASM-(4-6)(V)R(W)1E	RASM-7R(W)1E
Factory setting			




## 6.2.1.7 DSW7

### ◆ Function selection

RASM-(2/3)VRE: PCB1

RASM-(4-6)VR(W)1E: PCB2

RASM-(4-7)R(W)1E: PCB1

DSW7	RASM-(2/3)VRE	RASM-(4-7)(V)R(W)1E
Factory setting		
Open valves (when DSW1 for test run pin 4 is switched ON)	Not applicable	

## 6.2.1.8 DSW301

### ◆ Test run mode (Only for RASM-(2/3)VRE)

RASM-(2/3)VRE: PCB2

DSW301	RASM-(2/3)VRE
Factory setting	
Test run for pump down	
Not available	
Not available	
Not available	
Forced stoppage of compressor	


### NOTE

- This operation is reset once the compressor is in Thermo-ON mode.
- During the test run operation the units will operate continuously during 2 hours without Thermo-OFF and the 3-minute guard for compressor protection will be effective.
- Test run will start within 20 seconds after setting DSW1 pin 1 to ON position.

## 6.2.1.9 DSW302

### ◆ Optional Function setting (Only for RASM-(2/3)VRE)

RASM-(2/3)VRE: PCB2

DSW302	RASM-(2/3)VRE
Factory setting	



## 6.2.1.10 LED indication

### ◆ RASM-(2-3)VRE

Name	Colour	Indication
PCB1		
LED1	Red	Power
LED2	Green	Communication with inverter
LED3	Yellow	H-LINK transmission
LED4	Yellow	Not used
LED351	Red	For inspection
LED353	Red	For inspection
PCB2		
LD1	Red	For inspection
LD2	Red	For inspection
LD3	Red	For inspection
LD4	Red	For inspection





### ◆ RASM-(4-7)(V)R(W)1E

Name	Colour	Indication
LED1	Red	This LED indicates the transmission status between the indoor unit and the unit controller
LED2	Yellow	This LED indicates the transmission status between the indoor unit and the outdoor unit
LED3	Green	Power source for the PCB

## 6.2.2 Water cycle PCB

### 6.2.2.1 DSW1

#### ◆ Additional setting 1




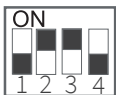



DSW1	RASM-(V)R(1)E	RASM-(V)RW1E	HWM-WE	HWD-WE-220S(-K)
Factory setting (*)				





#### NOTE

(\*): In case of installing the “Cooling kit” accessory, set the pin 4 of DSW1 to ON in order to enable the cooling operation.

### 6.2.2.2 DSW2







#### ◆ Unit capacity setting

DSW2	Factory setting	Setting required in HWM-WE and HWD-WE-220S(-K) for combination
HWM-WE HWD-WE-220S(-K)		<div style="display: flex; flex-direction: column; gap: 10px;"> <div>                      with RASM-4(V)RW1E                 </div> <div>                      with RASM-5(V)RW1E                 </div> <div>                      with RASM-6(V)RW1E                 </div> <div>                      with RASM-7RW1E                 </div> </div>
RASM-2VRE		Not applicable
RASM-3VRE		Not applicable

DSW2	Factory setting	Setting required in HWM-WE and HWD-WE-220S(-K) for combination
RASM-4(V)R(W)1E		Not applicable
RASM-5(V)R(W)1E		Not applicable
RASM-6(V)R(W)1E		Not applicable
RASM-7R(W)1E		Not applicable

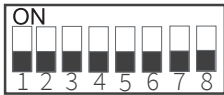
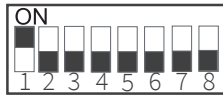
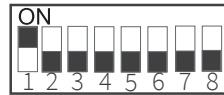
### 6.2.2.3 DSW3

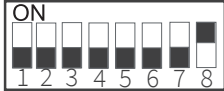
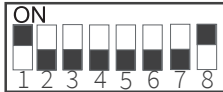
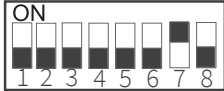
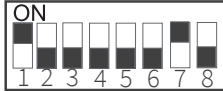

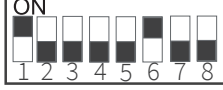


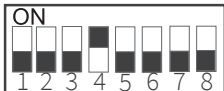

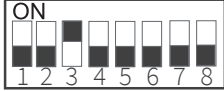

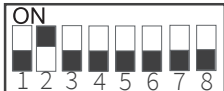
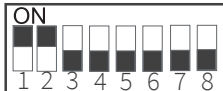
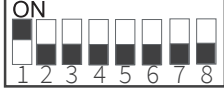
#### ◆ Additional setting 1

DSW3	RASM-VR(1)E	RASM-R1E	RASM-(V)RW1E	HWM-WE HWD-WE-220S(-K)
Factory setting				
1 step heater for 3 phase unit option	Not applicable		Not applicable	

### 6.2.2.4 DSW4

#### ◆ Additional setting 2

DSW4	RASM-(V)R(1)E	RASM-(V)RW1E	HWM-WE HWD-WE-220S(-K)
Factory setting			

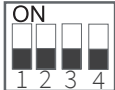






DSW4	RASM-(V)R(1)E	RASM-(V)RW1E	HWM-WE HWD-WE-220S(-K)
DHW defrost		Not applicable	 (Not applicable for HWD-WE-220S(-K))
Heater forced OFF		Not applicable	
Unit and installation pipes antifreeze protection		Not applicable	
Standard / ECO water pump operation		Not applicable	
Electric heater or boiler emergency mode		Not applicable	
DHW tank's heater operation		Not applicable	
DHW 3-way valve forced ON		Not applicable	
Mirror function (YUTAKI Mirror)		Not applicable	Not applicable

## CAUTION

- Never turn all DSW4 DIP switch pins ON. If this happens, the software of the unit will be removed.
- Never activate “Heater Forced OFF” and “Electric heater or boiler emergency mode” at the same time.
- For YUTAKI M units RASM-(V)R(1)E using a Mirror box accessory, SWW1 must be changed to Local.
- When DSW4#1 is OFF and it is not required any combination with Mirror box accessory, set SSW1 to Local in order to operate without Remote Controller.


## 6.2.2.5 DSW5

### ◆ Additional setting 3

DSW5	RASM-(V)RW(1)E	RASM-(V)R(1)E HWM-WE HWD-WE-220S(-K)
Factory setting		
Outdoor unit sensor for circuits 1 and 2.	Not applicable	
Outdoor unit sensor for circuit 1; Auxiliary sensor for circuit 2.	Not applicable	
Auxiliary sensor for circuit 1; Outdoor unit sensor for circuit 2.	Not applicable	
Auxiliary sensor instead of outdoor unit sensor for both circuits.	Not applicable	
Use the maximum temperature value between Two3 (boiler / heater thermistor) and Two (water outlet thermistor) for water control	Not applicable	




## 6.2.2.6 DSW6 (only if available)

### ◆ Not used

DSW6	RASM-(V)R(W)(1)E HWM-WE HWD-WE-220S(-K)
Factory setting (do not change)	

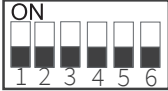

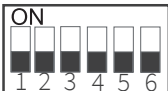

## 6.2.2.7 DSW7

### ◆ Additional setting 4

DSW7	RASM-(V)RW(1)E	RASM-(V)R(1)E HWM-WE HWD-WE-220S(-K)
Factory setting		
Compatibility with ATW-RTU-04 (When cooling mode operation is needed)	Not applicable	

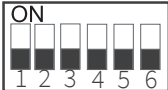

## 6.2.2.8 DSW15 & RSW2

### ◆ Refrigerant cycle address

DSW15 & RSW2	RASM-(V)R(W)(1)E HWM-WE HWD-WE-220S(-K)
Factory setting	 
Refrigerant cycle address setting (Required only when YUTAKI Cascade Controller is installed)	Example of system setting with a value of: 5  


## 6.2.2.9 DSW16 & RSW1

### ◆ Not used

DSW16 & RSW1	RASM-(V)R(W)(1)E HWM-WE HWD-WE-220S(-K)
Factory setting (Do not change)	 





## 6.2.2.10 DSW18

### ◆ Not used

DSW18	RASM-(V)R(W)(1)E HWM-WE HWD-WE-220S(-K)
Factory setting (Do not change)	

## 6.2.2.11 SSW1

### ◆ Remote/Local



SSW1	RASM-(V)R(1)E	RASM-(V)RW1E	HWM-WE HWD-WE-220S(-K)
Factory setting	Remote Local 	Remote Local 	Remote Local 
Local operation	Remote Local 	Not available	Not available

### NOTE

- For YUTAKI M units RASM-(V)R(1)E using a Mirror box accessory, SSW1 must be changed to Local.
- For YUTAKI M units RASM-(V)R(1)E: When DSW4#1 is OFF and it is not required any combination with Mirror box accessory, set SSW1 to Local in order to operate without Remote Controller.

## 6.2.2.12 SSW2

### ◆ Heat/Cool

SSW2	RASM-(V)R(W)(1)E HWM-WE HWD-WE-220S(-K)
Factory setting (Heat operation in case of Local)	Heat Cool 
Cool operation in case of Local	Heat Cool 

### NOTE

Only for YUTAKI M units RASM-(V)R(1)E (Factory setting DSW4#1 is OFF).

## 6.2.2.13 LED indication

Name	Colour	Indication
LED1	Green	Power indication
LED2	Red	Power indication
LED3	Red	Heat pump operation (thermo ON/OFF)
LED4	Yellow	Alarm (flickering with 1 sec interval)
LED5	Green	Not used
LED6	Yellow	H-Link transmission
LED7	Yellow	H-Link transmission for unit controller



## Commissioning

7.1	Before operation .....	98
7.2	Preliminary check .....	98
7.2.1	Checking the unit .....	98
7.2.2	Electrical checking.....	98
7.2.3	Hydraulic circuit checking (space heating and DHW) .....	99
7.2.4	Checking the refrigerant circuit .....	99
7.2.5	Test and check .....	100
7.3	Commissioning procedure .....	100
7.4	Test run / air purge .....	101

## 7.1 Before operation

### CAUTION

- Supply electrical power to the system for approximately 12 hours before start-up after a long shut-off. Do not start the system immediately after power supply, it may cause compressor failure because the compressor is not well-heated.
- When the system is started after a shut-off longer than approximately 3 months, it is recommended that the system be checked by your service contractor.
- Turn OFF the main switch when the system is to be stopped for a long period of time: as the oil heater is always energized even when the compressor is not working, there will be electricity consumption unless the main switch is turned OFF.

## 7.2 Preliminary check

When installation is complete, perform commissioning according to the following procedure, and hand over the system to the customer. Perform the commissioning of the units methodically, and check that the electrical wiring and the piping are correctly connected.

YUTAKI M / YUTAKI Hydrosplit units must be configured by the installer to get the perfect setting and the unit working.

### 7.2.1 Checking the unit

- Check external appearance of the unit to look for any damage due to transportation or installation.
- Check that all the covers are totally closed.
- Check that the recommended service space is respected.
- Check that the unit has been correctly installed.

### 7.2.2 Electrical checking

#### CAUTION

*Do not operate the system until all the check points have been cleared:*

- Check to ensure that the electrical resistance is more than 1 MΩ, by measuring the resistance between ground and electrical parts terminal. If not, do not operate the system until the electrical leakage is found and repaired. Do not impress the voltage on the terminals for transmission and sensors .
- Check to ensure that the switch on the main power source has been ON for more than 12 hours, in order to give the oil heater time to warm the compressor.
- In three-phase unit check phase sequence connection on terminal board.
- Check the power supply voltage ( $\pm 10\%$  of the rated voltage).

- Check that field-supplied electrical components (main switches, breakers, wires, conduit connectors and wire terminals) have been properly selected according to the electrical specifications given in this document, and check that the components comply with national and local standards.
- Do not touch any electrical components for more than three minutes after turning OFF the main switch
- Check the DIP switch settings of the unit are connected as shown in the chapter “6.2 Setting of DIP switches and RSW switches”.
- Check to ensure the electrical wiring of the unit is connected as shown in the chapter.
- Check to ensure the external wiring is correctly fixed. To avoid problems with vibrations, noises and cut out wires with the plates.

## 7.2.3 Hydraulic circuit checking (space heating and DHW)

- Check that the circuit has been properly flushed and filled with water and that the installation has been drained: the pressure of the heating circuit must be 1.8 bar
- Check for any leakage in water cycle. Pay special attention to the water piping connections.
- Make sure the system’s internal water volume is correct.
- Check that the hydraulic circuit’s valves are fully open.
- Check to see that additional water pumps (WP2 or/and WP3) are correctly connected to terminal board.

### CAUTION

- Operating the system with closed valves will damage the unit.
- Check to see that air purge valve is open and that the hydraulic circuit is air purged. The installer is responsible of completely air purging the installation.
- Remember that water connection must be accordance with local regulations.
- Electrical heater operation when not completely filled with water will damage the heater.
- Refer to “*Drain and water piping*” chapter for more information about requirements and recommendations.

## 7.2.4 Checking the refrigerant circuit

- Check to ensure that the stop valves on the gas and liquid lines are fully open.
- Check the inside of the unit for refrigerant leakage. If there is a refrigerant leak, call your dealer.
- Do not touch any of the parts by hand at the discharge gas side, since the compressor chamber and the pipes at the discharge side are heated higher than 90°C.
- DO NOT PUSH THE BUTTON OF THE MAGNETIC SWITCH(ES), it will cause a serious accident.
- Confirm that the leakage of the refrigerant does not exist. The flare nuts are sometimes loosened by vibration during transportation

## 7.2.5 Test and check

Finally, test and check the following items:

- Water leakage
- Refrigerant leakage
- Electrical connection

### NOTE

Please refer to the chapters of “5.1.5 Water filling” and “7.3 Commissioning procedure” in this document and refer the Outdoor unit Installation and Operation manual for the specific details about refrigerant charge tasks.

### DANGER

**Do not connect the power supply to the indoor unit prior to filling the space heating circuit (and DHW circuit if it were the case) with water and checking water pressure and the total absence of any water leakage.**

## 7.3 Commissioning procedure

This procedure is valid regardless of what options are on the module.

- When installation is complete and all necessary settings (DIP-switches in PCBs and user controller configuration) have been carried out, close the electrical box and place the cabinet as shown in the manual.
- Make the start-up wizard configuration in the user controller.
- Make a test run as shown in item “7.4 Test run / air purge”.
- After test run is completed, start the entire unit or the selected circuit by pressing the OK button.

### ◆ Initial start-up at low outdoor ambient temperatures

During commissioning and when water temperature is very low, it is important for the water to be heated gradually. Additional optional function can be used for starting at low water temperature conditions: Screed drying function:

- ✓ The screed function is used exclusively for the process of drying a newly applied screed to the floor heating system. The process is based on EN-1264 par 4.
- ✓ When user activates screed function, the water set point follows a predetermined schedule:

- 1 Water set point is kept constant at 25°C for 3 days
- 2 Water set-point is set to the maximum Heating supply temperature (but always limited to ≤ 55°C) for 4 days.

## CAUTION

- Heating at lower water temperatures (approximately 10°C to 15°C) and lower outdoor ambient temperatures (<10°C) can be damaging to the heat pump when defrosting.
- As a result, Heating up to 15°C when outdoor temperature is lower than 10°C is performed by the electrical heater.

## NOTE

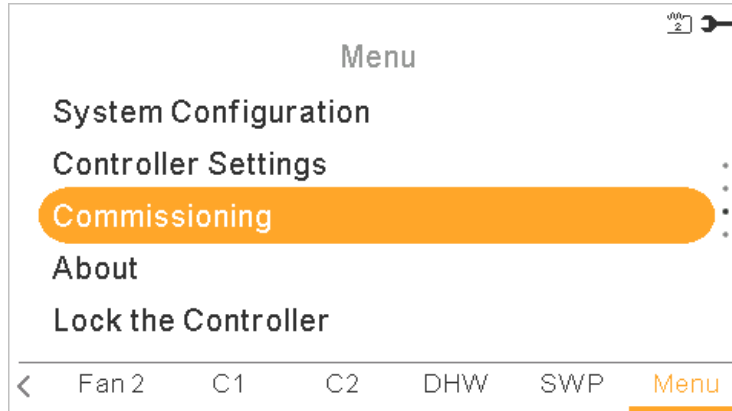
In case of Heater Forced OFF (by optional DIP switch setting) these condition is not performed and heating is performed by Heat Pump. HITACHI is not responsible for its operation.

## CAUTION

It is recommended start the unit (first power ON) with heater forced OFF and compressor forced OFF (See “6.2 Setting of DIP switches and RSW switches”). In order to circulate water by water pump and remove possible air into the heater (Check heater completely filled).

## 7.4 Test run / air purge

Test run is a working mode used when commissioning the installation. Some settings are made to let the installer an easy job. Air purge function drives the pump in a way for evacuating air bubbles in the installation.

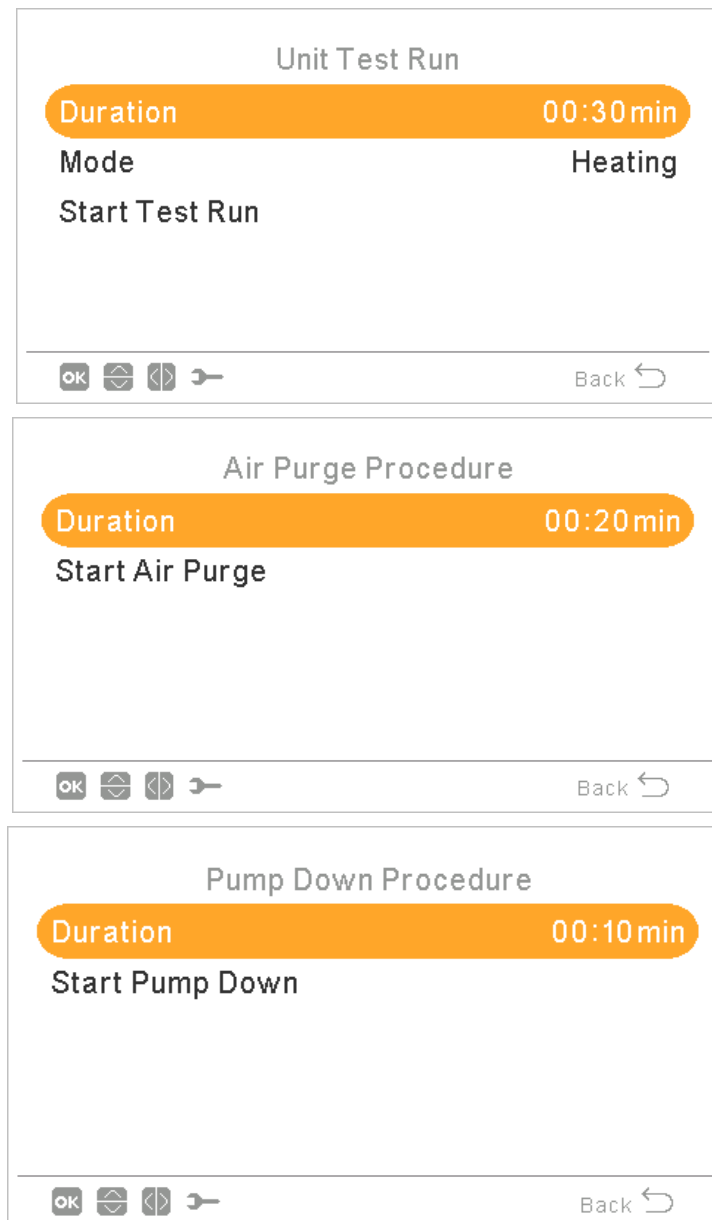


Example for PC-ARFH2E

This menu shows the following test to be launched:

- Unit Test Run
- Air Purge
- Screed Drying
- Pump down procedure

After “Test Run”, “Air Purge” or “Pump down procedure” option is selected, the YUTAKI user controller asks for the duration of the test.

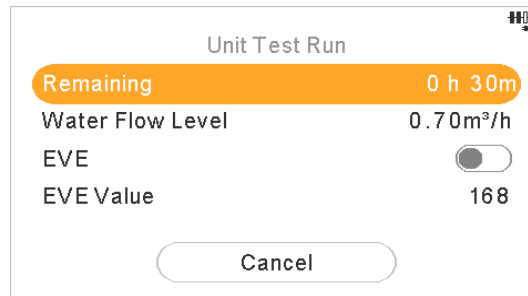


*Example for PC-ARFH2E*

In case of test run, user can also select the mode of the test (cooling or heating).

When user confirms the test run or the air purge, the YUTAKI user controller sends the order to the indoor.

During the execution of this test, the following screen is shown:



When the test starts, the user controller will exit from the installer mode.

User can cancel the test run regardless of the time left for test finishing.

The Test Run icon is shown in the notifications zone, but the notification of this test run is taken from H-LINK.

When test run has finished, an information message is displayed in the screen, and pressing accept, the user returns to the global view.

## **i** NOTE

- *When commissioning and installing the unit, it is very important to use the “Air purge” function to remove all the air in the water circuit. When the air purge function is running, the water pump starts the automatic air venting routine which consists of regulating the speed and open/close configured 3-way valve to help to evacuate air from the system.*
- *If there is a Heater or a Boiler installed, disable the operation before running the test run.*

## Maintenance

8.1	YUTAKI M R32 and YUTAKI Hydrosplit R32 .....	105
8.1.1	RASM-(2-3)VRE .....	105
8.1.1.1	Removing the service cover .....	105
8.1.1.2	Removing the upper cover .....	106
8.1.1.3	Removing the front cover .....	107
8.1.1.4	Removing the rear cover .....	107
8.1.2	RASM-(4-7)(V)R(W)1E .....	109
8.1.2.1	Removing the service cover .....	109
8.1.2.2	Removing the upper cover .....	110
8.1.2.3	Removing the rear cover .....	111
8.2	YUTAKI H .....	112
8.2.1	Removing the indoor unit service cover .....	112
8.2.2	Removing indoor unit electrical box .....	113
8.2.3	Space heating pipes connection .....	114
8.2.3.1	Drain pipes connection .....	114
8.2.4	Cover assembly .....	115
8.3	YUTAKI H Combi .....	117
8.3.1	Removing the indoor unit covers .....	117
8.3.2	Removing indoor unit electrical box .....	118
8.3.3	Space heating pipes connection .....	119
8.3.4	DHW pipes connection .....	120
8.3.4.1	Drain pipes connection .....	120



## 8.1 YUTAKI M R32 and YUTAKI Hydrosplit R32

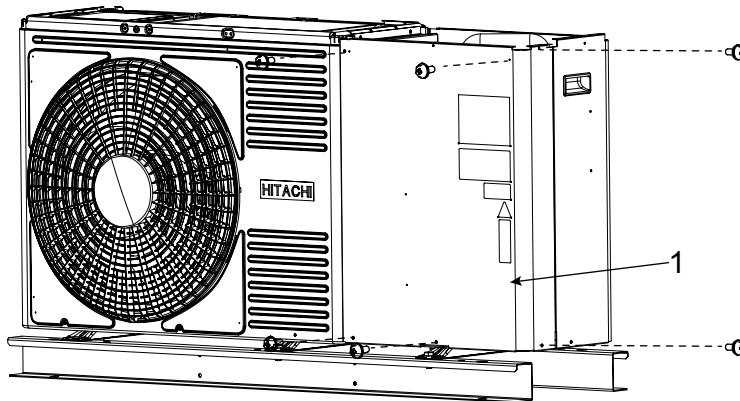
### 8.1.1 RASM-(2-3)VRE

#### 8.1.1.1 Removing the service cover

**i** NOTE

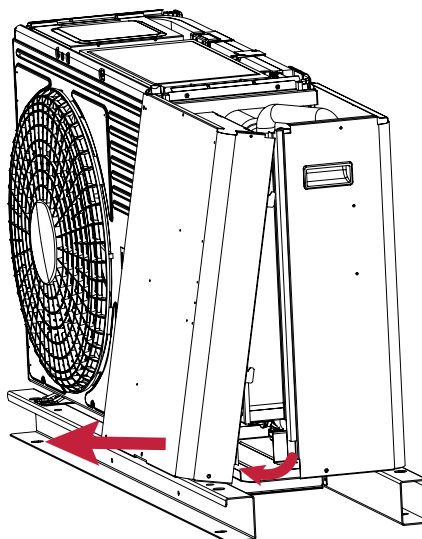
*Service cover needs to be removed for most of operations inside the outdoor unit.*

- 1 Remove the upper cover as explained in “8.1.1.2 Removing the upper cover”
- 2 Remove the 6 screws fixing the Service cover.



1- Service cover

- 3 Slide the service cover slightly downwards and remove it pulling it backwards.

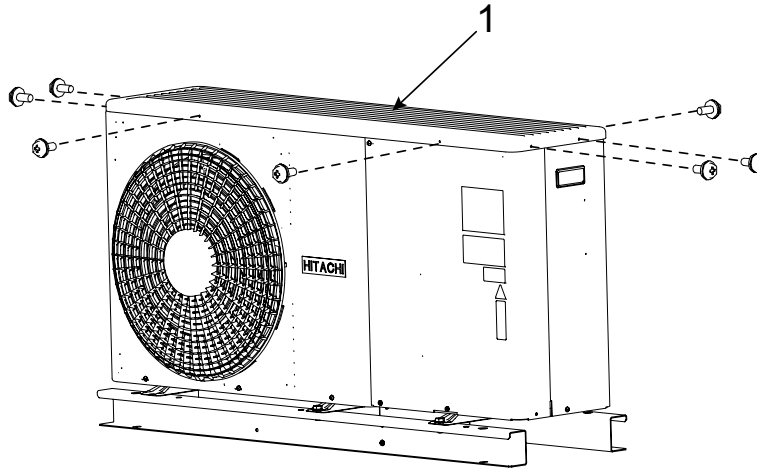


**!** CAUTION

*Pay attention of no falling off the service cover.*

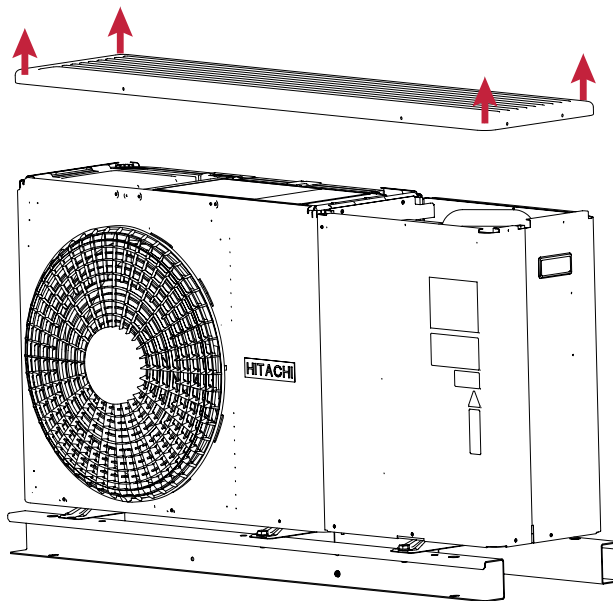
## 8.1.1.2 Removing the upper cover

- 1 Remove the 7 screws fixing the Upper cover



1- Upper cover

- 2 Pull the Upper cover upwards and remove it.

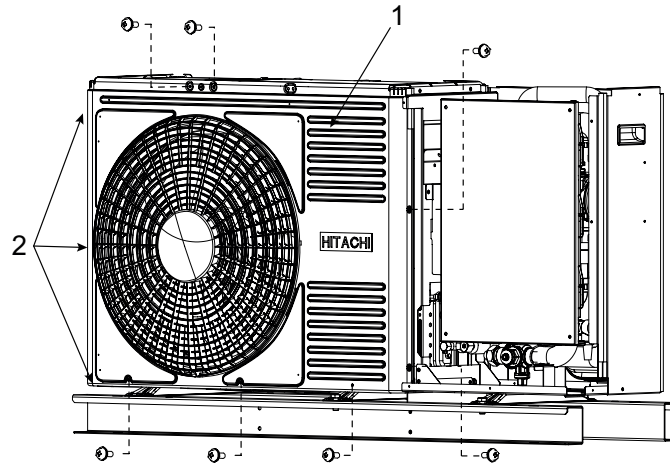


### CAUTION

*Pay attention of no falling off the upper cover.*

## 8.1.1.3 Removing the front cover

- 1 Remove the upper cover as explained in “8.1.1.2 Removing the upper cover”
- 2 Remove the service cover as explained in “8.1.1.1 Removing the service cover”
- 3 To remove the front cover remove 7 fixing screws and 3 left nails.



1- Front cover

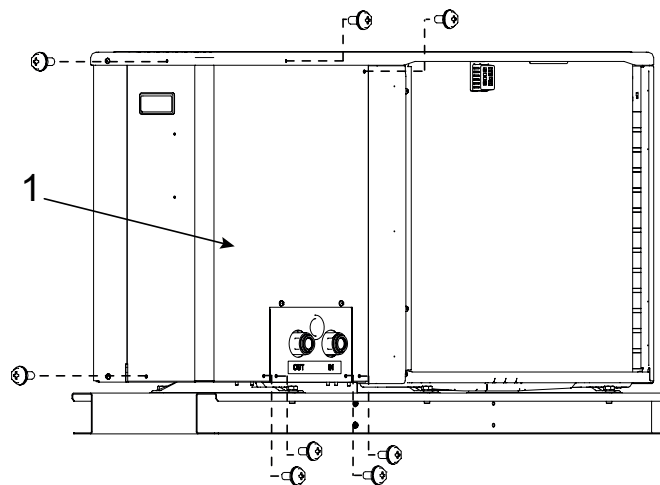
2- Nails

### CAUTION

Pay attention of no falling off the front cover.

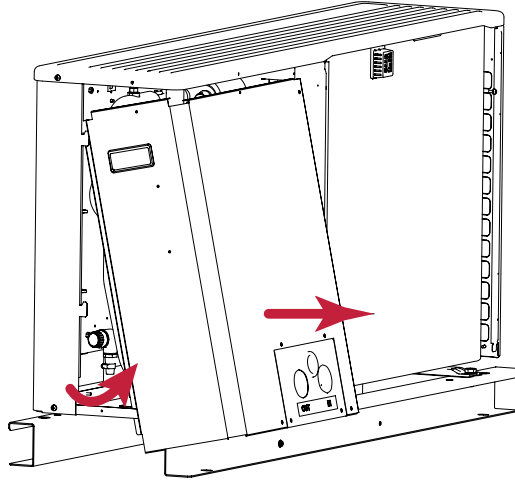
## 8.1.1.4 Removing the rear cover

- 1 Remove the 8 screws fixing the rear cover: 2 screws at the right side and 6 screws at the rear side.



1- Rear cover

2 Slide the Rear cover slightly downwards and remove it pulling it backwards.



**⚠ CAUTION**

*Pay attention of no falling off the rear cover.*

## 8.1.2 RASM-(4-7)(V)R(W)1E

### 8.1.2.1 Removing the service cover

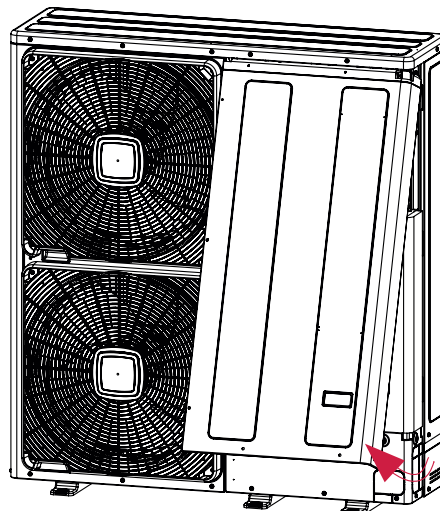
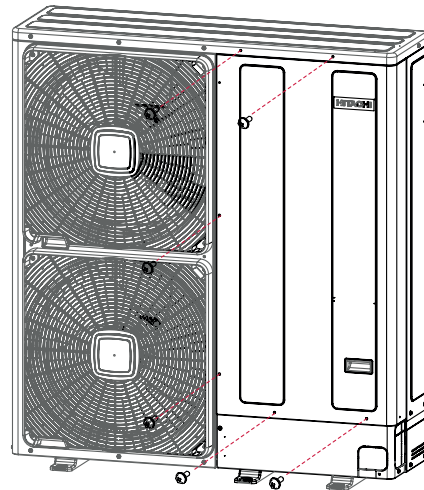
#### NOTE

*Service cover needs to be removed for most of operations inside the outdoor unit.*

- 1 Remove the 6 screws fixing the Service cover.
- 2 Remove the screw at the right side of the unit fixing the Service cover
- 3 Slide the service cover slightly downwards and remove it pulling it backwards.

#### CAUTION

*Pay attention of no falling off the service cover.*

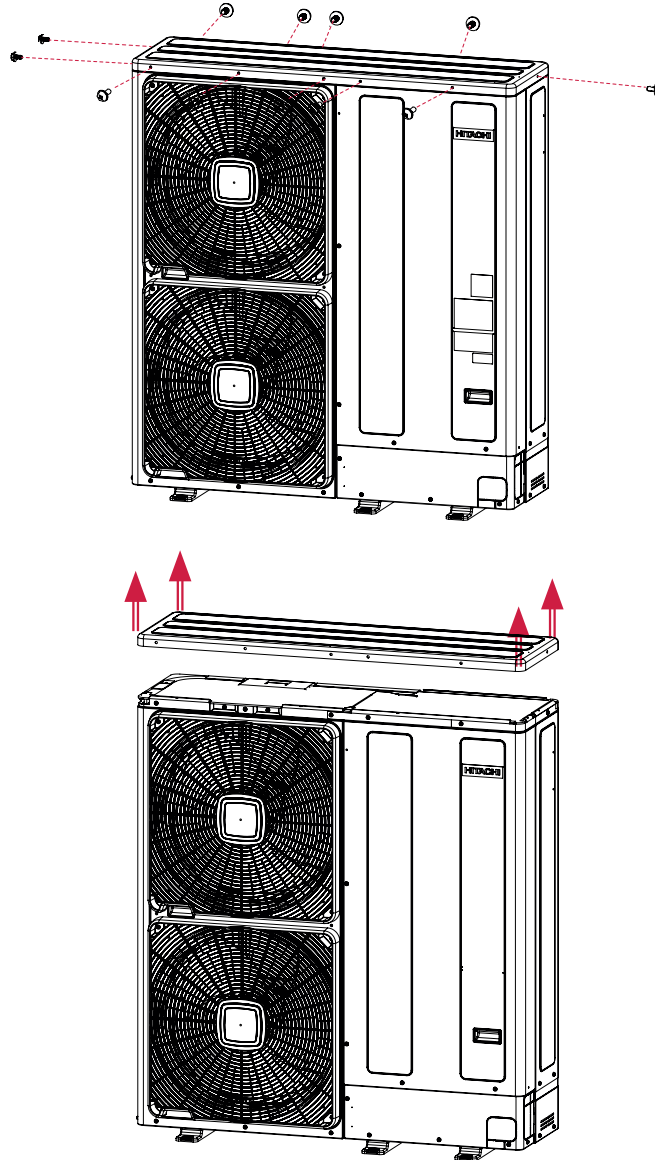


## 8.1.2.2 Removing the upper cover

- 1 Remove the 13 screws fixing the upper cover.
- 2 Pull the upper cover upwards and remove it.

**⚠ CAUTION**

*Pay attention of no falling off the upper cover.*

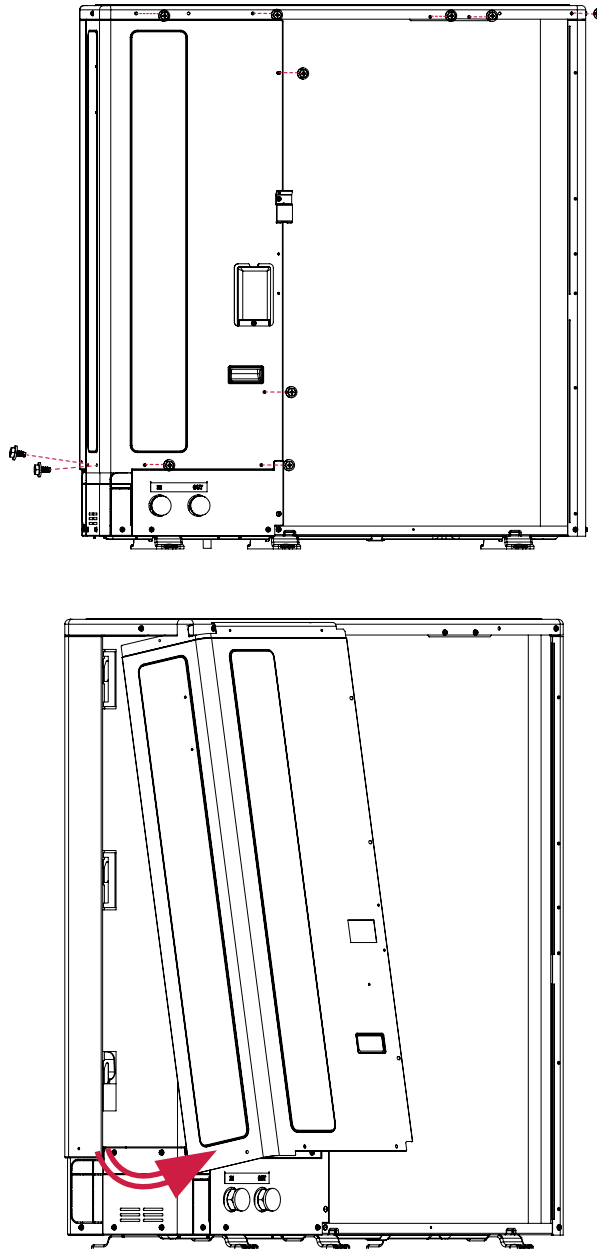


## 8.1.2.3 Removing the rear cover

- 1 Remove the 11 screws fixing the rear cover.
- 2 Slide the Rear cover slightly downwards and remove it pulling it backwards.

**⚠ CAUTION**

*Pay attention of no falling off the Rear cover.*



## 8.2 YUTAKI H

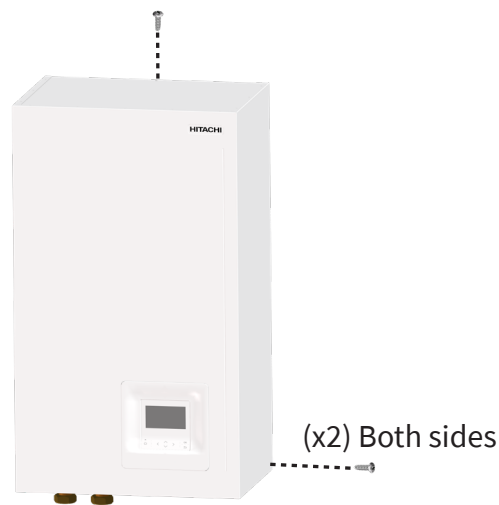
If it is necessary to access to the indoor unit components, please follow these operations.

### 8.2.1 Removing the indoor unit service cover

#### NOTE

*The indoor unit service cover needs to be removed for any task inside the indoor unit.*

- 1 Remove the screws which fix the service cover.



- 2 Slide the service cover slightly upward and remove it pulling to back.



#### CAUTION

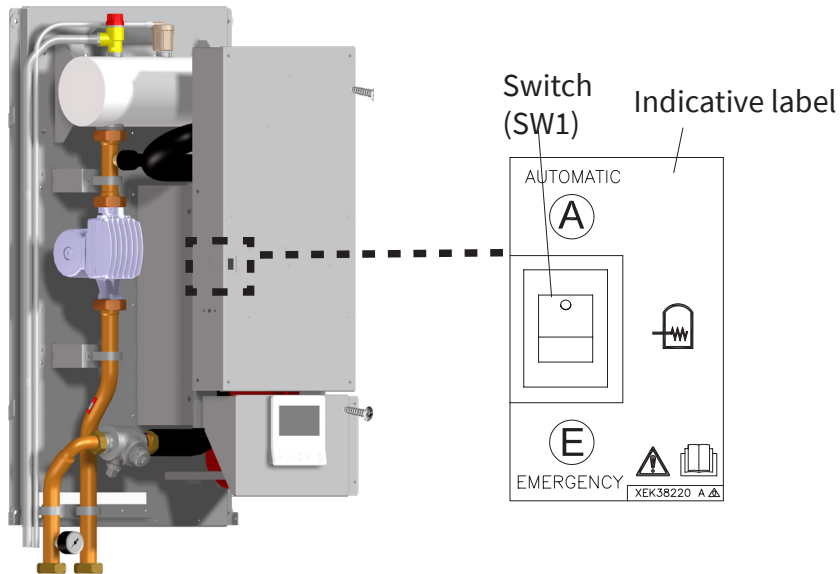
- Pay attention of no falling off the service cover.
- Take care when removing service cover; the parts inside the unit could be hot.



## 8.2.2 Removing indoor unit electrical box

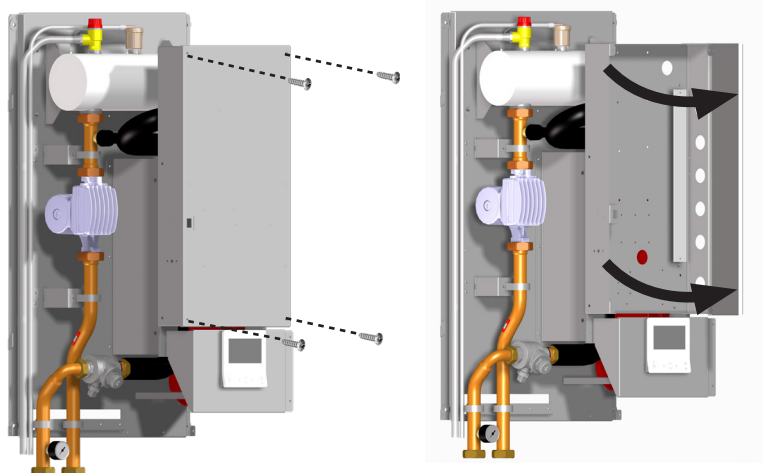
**⚠ DANGER**

- Disconnect the unit from the power supply before touching any of the parts in order to avoid an electrical shock.
- Do not touch the switch for DHW tank heater operation when handling the electrical box. Keep the position of this switch in factory setting position (“Automatic” operation).



**◆ Remove the electrical box cover**

- 1 Remove the indoor unit service cover as explained above.
- 2 Unscrew the 2 front screws of the electrical box cover and then, rotate it.

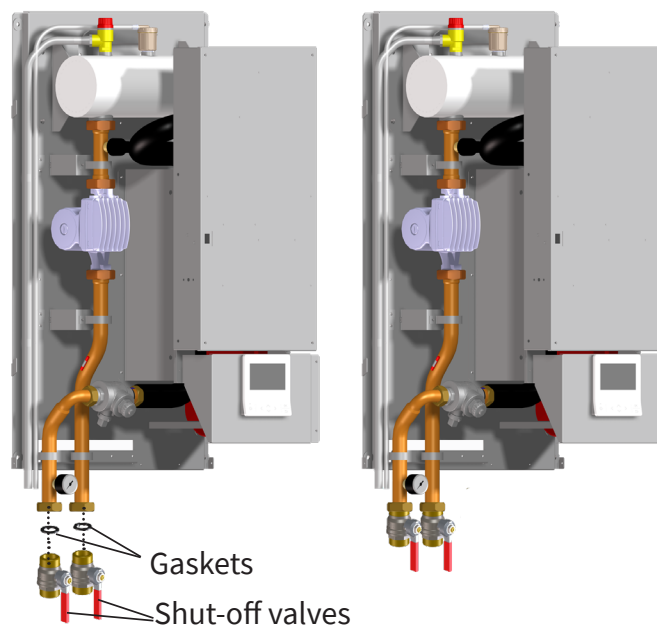


## CAUTION

Take care with the electrical box components in order to avoid damaging it.

### 8.2.3 Space heating pipes connection

The unit is factory supplied with two shut-off valves which have to be connected to the water inlet / outlet connections. With these shut-off valves it is very practical to connect the indoor unit to the heating system by using the factory supplied gaskets just below the valves (G 1-1/4" connection). Then, the space heating installation can be carried out.



#### 8.2.3.1 Drain pipes connection

For a correct drainage, connect the drain pipe for the safety valve to the general draining system.

#### NOTE

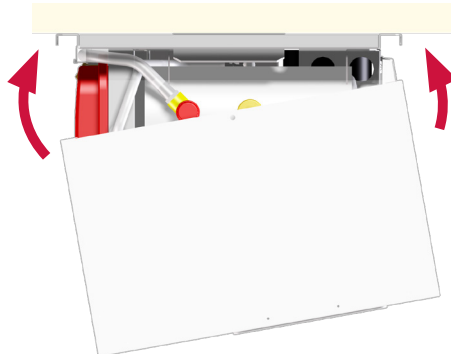
- The safety valve is activated when water pressure reaches 3 bars.
- Drain taps must be provided at all low points of the installation to permit complete drainage of the circuit during servicing.

## 8.2.4 Cover assembly

- 1 Place the indoor unit service cover at the same level of the wall mounted unit by taking it from the bottom side (one person can perform this operation, during this operation it is possible to rest the cover on the electrical box).



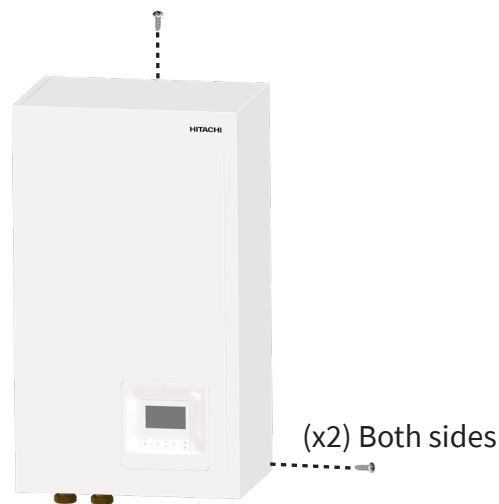
- 2 Place the holes on the right side of the indoor unit cover over the back plate hooks (x2 locations). When the right side is centred, repeat the operation on the left side. Put the holes on the left side of the indoor unit cover into the back plate frame hooks (x2 locations).



- 3 Once the 4 hooks are placed into their corresponding cover holes, adjust the cover to the end of the hooks.



- 4 Fix the indoor unit service cover using the screw which had been previously removed during the unpacking procedure.



## 8.3 YUTAKI H Combi

If it is necessary to access to the indoor unit components, please follow these operations.

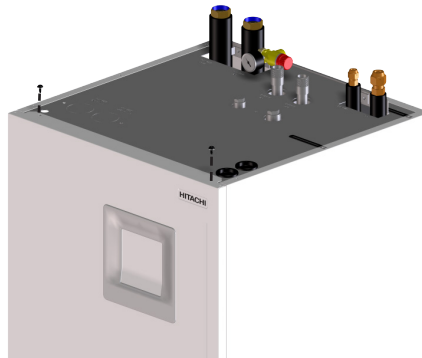
### 8.3.1 Removing the indoor unit covers

#### NOTE

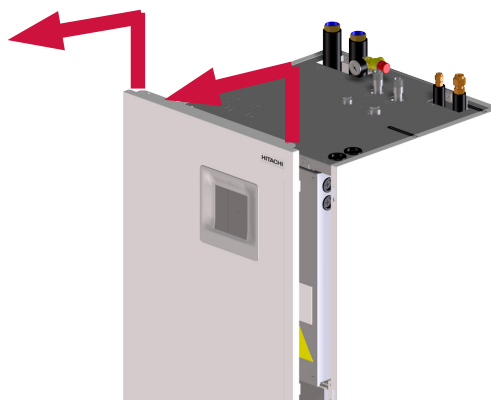
- Front cover needs to be removed for any task inside the indoor unit.
- Back, left and right covers do not need to be removed.

#### ◆ Removing the indoor unit front cover

- 1 Remove the 2 screws of the indoor unit front cover.



- 2 Slide the service cover slightly upward and remove it pulling to back.



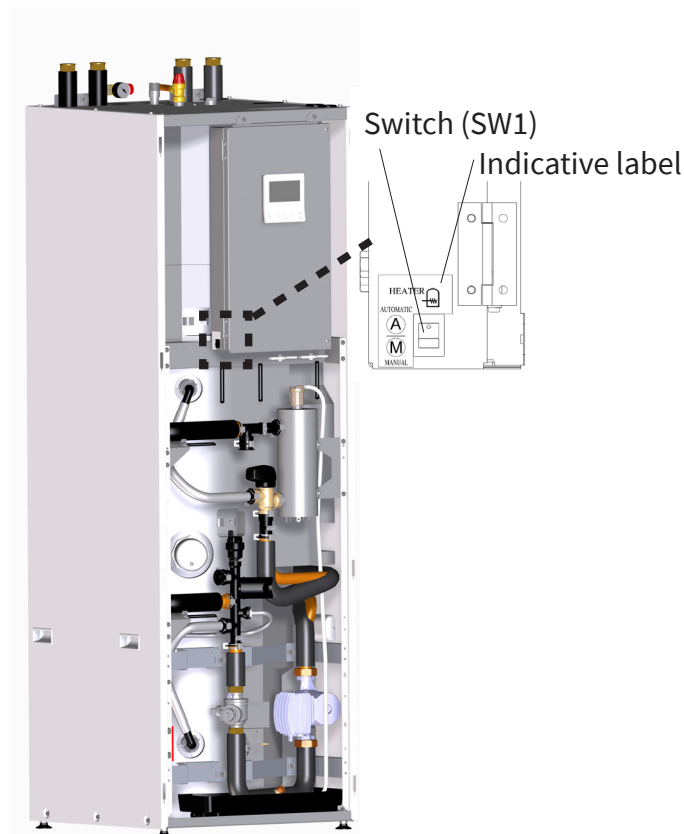
#### CAUTION

- Pay attention of no falling off the service cover.
- Take care when removing service cover; the parts inside the unit could be hot.

## 8.3.2 Removing indoor unit electrical box

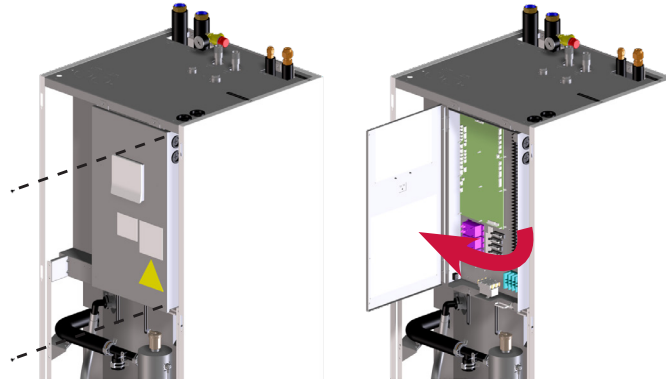
 **DANGER**

- **Disconnect the unit from the power supply before touching any of the parts in order to avoid an electrical shock.**
- **Do not touch the switch for DHW tank heater operation when handling the electrical box. Keep the position of this switch in factory setting position (“Automatic” operation).**



## ◆ Open the electrical box cover

- 1 Remove the indoor unit front cover.
- 2 Unscrew the 2 front screws of the electrical box cover and then, open it.

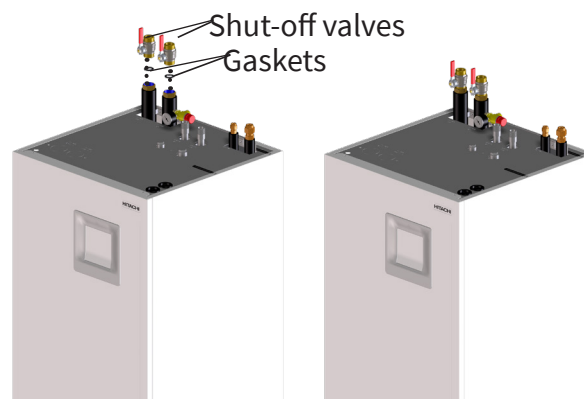


### ⚠ CAUTION

Take care with the electrical box components in order to avoid damaging it.

### 8.3.3 Space heating pipes connection

The unit is factory supplied with two shut-down valves to be connected to the water inlet/outlet pipe. With these shut-down valves it is very practical to connect the indoor unit to the heating system by using the factory supplied gaskets just below the valves (2-3HP: G 1"; 4-6HP: G 1-1/4"). Then, the space heating installation can be carried out.



## 8.3.4 DHW pipes connection

The connection between the DHW installation and the DHW connections of the indoor unit must be done taking into account the following considerations:

- 1 Install a pressure and temperature relief valve at the DHW inlet connection (as close as possible to the tank) to provide the following functions.
  - Pressure protection
  - Non-return function
  - Shut-down valve
  - Filling
  - Draining

If not, an specific device for each function should be installed.

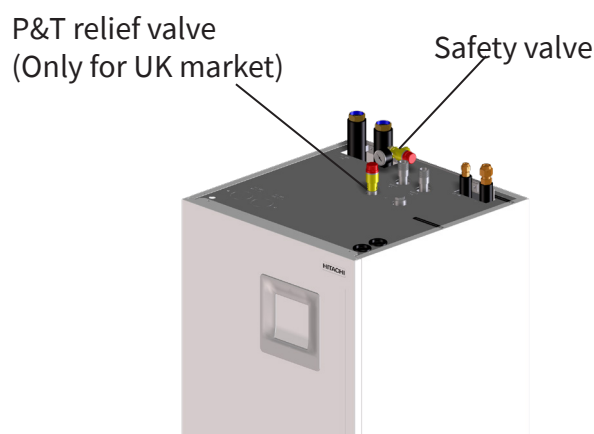
- 2 Install also a shut-down valve (field supplied) in the DHW outlet connection, in order to make easier any maintenance work.

### **i** NOTE

For more details, refer to the section *“5.5 Space heating and DHW for YUTAKI M / YUTAKI Hydrosplit”*.

### 8.3.4.1 Drain pipes connection

For a correct drainage, connect the drain pipe for the safety valve (located at the top rear side of the unit) to the general draining system.



### **i** NOTE

- The safety valve is activated when water pressure reaches 3 bars.
- Drain taps must be provided at all low points of the installation to permit complete drainage of the circuit during servicing.
- P&T relief valve is activated when water pressure reaches 7 bar and/or water temperature reaches 96°C



- *Discharge pipe must be made of metal or any other material capable to withstand the high pressure and high temperature from the P&T relief valve.*
- *For a correct installation and workpipe of the discharge pipe on UK market models, refer to UK Building Requirements*

## Cooling & Heating

Johnson Controls-Hitachi Air Conditioning Spain, S.A.U.  
Ronda Shimizu, 1 - Políg. Ind. Can Torrella  
08233 Vacarisses (Barcelona) Spain

© Copyright 2022 Johnson Controls-Hitachi Air Conditioning Spain, S.A.U. – All rights reserved.