HITACHI

YUTAKI SERIES

Technical Catalogue

Split system - Outdoor unit
RAS-(2-10)WH(V)NP(E)

Split system - Indoor unit

YUTAKI S
RWM-(2.0-10.0)NE(-W)

YUTAKI S COMBI
RWD-(2.0-6.0)NW(S)E-(200/260)S(-K)(-W)

YUTAKI S80
RWH-(4.0-6.0)(V)NF(W)E

YUTAKI S80 TANK
DHWS(200/260)S-2.7H2E(-W)

Monobloc system

YUTAKI M
RASM-(3-6)(V)NE







HITACHI

Contents

General information 1
Features and benefits 2
General data 3
Capacity and selection data 4
Acoustic characteristic curves 5
Working range 6
General dimensions 7
Refrigerant cycle and hydraulic circuit 8
Refrigerant and water piping 9
Electrical and control settings 10
Optional functions 11

General Index

1. General information 1

1.1 General information 2

1.1.1 General notes 2
1.1.2 Introduction 2
1.1.2.1 Overview of YUTAKI system 2
1.1.2.2 Summary of operations 3

1.2 Applied symbols 5

1.3 Norms and Regulations 5

1.4 Product guide 6

1.4.1 Classification of the units 6
1.4.1.1 Split system - Outdoor unit 6
1.4.1.2 Split system - Indoor unit 6
1.4.1.3 Monobloc system 7
1.4.2 Product guide 8
1.4.2.1 Split system - Outdoor unit 8
1.4.2.2 Split system - Indoor unit 8
1.4.2.3 Monobloc system 12
1.4.3 Accessory code list 13

2. Features and benefits 17

2.1 Selection benefits 18

2.1.1 Wide selection range 18
2.1.2 High efficiency system. Wide capacity range 21
2.1.3 Wide range of accessories and components 21

2.2 Installation benefits 28

2.2.1 YUTAKI S compact dimensions 28
2.2.2 YUTAKI S80 connection options 29
2.2.3 YUTAKI S COMBI 29
2.2.3.1 New mixing kits ATW-2TK-06 and ATW-2TK-07 29

2.3 Maintenance benefits 31

2.3.1 Filter + for the water circuit 31

2.4 Control features 32

2.4.1 Unit controller: more functions 32
2.4.2 I/O and sensor functions 32

2.5 Complementary system - YUTAKI CASCADE CONTROLLER 33

2.5.1 Multi configurations 33
2.5.2 Installation benefits 34
2.5.3 Maintenance benefits 36
2.5.4 Control features 36
2.5.5 CASCADE control 37
2.5.6 Rotary token control 38
2.5.7 Synchronized defrost 39

3. General data 41

3.1 Capacity tables 43

3.1.1 Nominal capacity-performance tables 43

3.1.1.1 Considerations 43

3.1.1.2 Capacity-performance data 43

3.2 ERP performance data 46

3.2.1 General considerations 46

3.2.2 General ERP data for space heaters 46

3.2.2.1 ERP data - YUTAKI S 46

3.2.2.2 ERP data - YUTAKI S COMBI 52

3.2.2.3 ERP data - YUTAKI S80 57

3.2.2.4 ERP data - YUTAKI M 62

3.2.2.5 ERP additional data - YUTAKI S 65

3.2.2.6 ERP additional data - YUTAKI S COMBI 66

3.2.2.7 ERP additional data - YUTAKI S80 67

3.2.2.8 ERP additional data - YUTAKI M 67

3.2.3 General ERP data for combi heaters (YUTAKI S COMBI & S80) 68

3.2.3.1 YUTAKI S COMBI 68

3.2.3.2 YUTAKI S80 69

3.2.4 General ERP data for hot water storage tanks (YUTAKI S , YUTAKI M & YUTAKI S 80) 69

3.3 General specifications 70

3.3.1 Considerations 70

3.3.2 Split system - Outdoor unit 71

3.3.3 Split system - Indoor unit 73

3.3.3.1 YUTAKI S 73

3.3.3.2 YUTAKI S COMBI 76

3.3.3.3 YUTAKI S80 82

3.3.4 Monobloc system - YUTAKI M 85

3.3.5 Domestic Hot Water Tank 87

3.3.6 Complementary system - YUTAKI CASCADE CONTROLLER 88

3.4 Component data 89

3.4.1 Split system - Outdoor unit 89

3.4.2 Split system - Indoor unit 91

3.4.2.1 YUTAKI S 91

3.4.2.2 YUTAKI S COMBI 92

3.4.2.3 YUTAKI S80 96

3.4.3 Monobloc system - YUTAKI M 97

3.5 Electrical data 99

3.5.1 Considerations 99

3.5.2 Split system - Outdoor unit 100

3.5.3 Split system - Indoor unit 101

3.5.3.1 YUTAKI S 101

3.5.3.2 YUTAKI S COMBI 101

3.5.3.3 YUTAKI S80 102

3.5.4 Monobloc system - YUTAKI M 104

3.5.5 Complementary system - YUTAKI CASCADE CONTROLLER 104

4. Capacity and selection data 105

4.1 System selection procedure 106

4.1.1 Selection parameters 106
4.1.2 Selection procedure 106
4.1.2.1 Description of procedure for YUTAKI S 108
4.1.2.2 Description of procedure for YUTAKI S COMBI 113
4.1.2.3 Description of procedure for YUTAKI S80 120
4.1.2.4 Selection procedure for YUTAKI M units 127
4.1.3 Flow rate and pressure drop check 133
4.2 System selection procedure (by Selection Software) 134
4.2.1 Introduction 134
4.2.2 How to use the Selection Software 134
4.3 YUTAKI S 153
4.3.1 Maximum heating capacity table (kW) (Integrated) 153
4.3.2 Maximum cooling capacity table (kW) 155
4.4 YUTAKI S COMBI 156
4.4.1 Maximum heating capacity table (kW) (Integrated) 156
4.4.2 Maximum cooling capacity table (kW) 158
4.5 YUTAKI S 80 159
4.5.1 Maximum heating capacity table (kW) (Integrated) 159
4.6 YUTAKI M 160
4.6.1 Maximum heating capacity table (kW) (Integrated) 160
4.6.2 Maximum cooling capacity table (kW) 161
4.7 Correction factors 162
4.7.1 Piping length correction factor 162
4.7.2 Correction factor owing to use of glycol (only for YUTAKI M) 165

5. Acoustic characteristic curves 167
5.1 Considerations 168
5.2 Sound pressure level for outdoor unit 169

6. Working range 171
6.1 Power supply working range 172
6.2 Temperature working range 172
6.2.1 Space heating 172
6.2.2 DHW 174
6.2.3 Swimming pool heating 175
6.2.4 Space cooling (Necessary cooling kit) 175
6.3 Hydraulic working range 176
6.3.1 Hydraulic data 176
6.3.2 Pump performance curves 177

7. General dimensions 183
7.1 Name of parts and Dimensional data 184

7.1.1 Split system - Outdoor unit 184
7.1.2 Split system - Indoor unit 186
7.1.2.1 YUTAKI S 186
7.1.2.2 YUTAKI S COMBI 189
7.1.2.3 YUTAKI S80 194
7.1.3 Monobloc system - YUTAKI M 197
7.1.4 Complementary system 199
7.1.4.1 YUTAKI CASCADE CONTROLLER 199

7.2 Service space 200
7.2.1 Split system - Outdoor unit 200
7.2.2 Split system - Indoor unit 201
7.2.2.1 YUTAKI S 201
7.2.2.2 YUTAKI S COMBI 201
7.2.2.3 YUTAKI S80 202
7.2.3 Monobloc system - YUTAKI M 205
7.2.4 Complementary system 205
7.2.4.1 YUTAKI CASCADE CONTROLLER 205

8. Refrigerant cycle and hydraulic circuit 207

8.1 Refrigerant cycle and hydraulic circuit for Split system 208
8.1.1 YUTAKI S 208
8.1.2 YUTAKI S COMBI 211
8.1.3 YUTAKI S80 213
8.1.3.1 Indoor unit standalone version 213
8.1.3.2 Indoor unit for integrated tank version 214

8.2 Refrigerant cycle and hydraulic circuit for Monobloc system - YUTAKI M 215

9. Refrigerant and water piping 217

9.1 General notes before performing piping work 218
9.1.1 Piping work 218
9.1.2 Suspension of refrigerant and water pipes 218

9.2 Refrigerant circuit 219
9.2.1 Refrigerant piping 219
9.2.2 Refrigerant charge 220
9.2.2.1 Refrigerant charge amount 220
9.2.2.2 Refrigerant charge before shipment (W_0 (kg)) 221
9.2.3 Precautions in the event of gas refrigerant leaks 221

9.3 Space heating and DHW 223
9.3.1 Additional hydraulic necessary elements for space heating 223
9.3.2 Additional hydraulic necessary elements for DHW 223
9.3.3 Additional hydraulic optional elements (For DHW) 226
9.3.4 Additional hydraulic necessary elements for DHW (only for UK market) 226
9.3.5 Requirements and recommendations for the hydraulic circuit 227
9.3.6 Water piping 228
9.3.7 Water quality 231

10. Electrical and control settings 233

10.1 General check 234

10.2 System wiring diagram 237
10.3 Electrical connection 239
10.3.1 Wiring size 239
10.3.2 Minimum requirements of the protection devices 242
10.4 Transmission wiring 244
10.4.1 YUTAKI units 244
10.4.2 YUTAKI CASCADE CONTROLLER 245
10.5 Optional indoor unit wiring (accessories) 247
10.6 Setting of DIP switches and RSW switches 251
10.6.1 Outdoor unit 251
10.6.1.1 Location of DIP switches and rotary switches 251
10.6.1.2 Function of DIP switches and rotary switches 252
10.6.1.3 LED indication 253
10.6.2 YUTAKI unit 254
10.6.2.1 Location of DIP switches and rotary switches 254
10.6.2.2 Function of DIP switches and rotary switches 254
10.6.2.3 LED indication 258

11. Optional functions 259

11.1 Indoor unit 260
11.1.1 Optional functions by DSW setting 260
11.1.2 Optional functions by Unit controller (PC-ARF(H/C)E) 262
11.1.2.1 Optional functions for Space Heating or Space Cooling 262
11.1.2.2 Optional functions for DHW 262
11.1.2.3 Optional functions for Heat pump 263
11.1.2.4 Optional functions for Unit controller (PC-ARF(H/C)E) 264
11.1.3 Optional external input/output configuration signals 264
11.2 Additional functions by accessory sensor 266
11.3 Change of defrost condition 267
11.4 Optional external output signals for outdoor units and YUTAKI M units 268

1. General information

Index

1.1 General information 2

1.1.1 General notes 2

1.1.2 Introduction 2

1.1.2.1 Overview of YUTAKI system 2

1.1.2.2 Summary of operations 3

1.2 Applied symbols 5

1.3 Norms and Regulations 5

1.4 Product guide 6

1.4.1 Classification of the units 6

1.4.1.1 Split system - Outdoor unit 6

1.4.1.2 Split system - Indoor unit 6

1.4.1.3 Monobloc system 7

1.4.2 Product guide 8

1.4.2.1 Split system - Outdoor unit 8

1.4.2.2 Split system - Indoor unit 8

1.4.2.3 Monobloc system 12

1.4.3 Accessory code list 13

1.1 General information

1.1.1 General notes

© Copyright 2018 Johnson Controls-Hitachi Air Conditioning Spain, S.A.U. – All rights reserved.

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 previously sold products. 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.

No type of modification must be made to the equipment without prior, written authorization from the manufacturer.

NOTE

This air conditioner has been designed for standard air conditioning for human beings. For use in other applications, please contact your HITACHI dealer or service contractor.

1.1.2 Introduction

HITACHI proudly announces the newest complete range of air-to-water heat pumps in its award-winning YUTAKI range.

YUTAKI units produce heating and domestic hot water like any oil or gas boiler, but transforming renewable energy from the outside air into heat. Air to water heat pumps extract the free energy present in the air, which is enough to heat a home up to a comfortable temperature, even on the coldest winter day. Every kW of electricity used to power the heat pump can yield up to more than 5 kW of energy for heating; this provides savings of up to 80% on heating expenses compared to a traditional fossil fuel boiler.

The new YUTAKI series, based on state-of-the-art technology, does not only achieve an outstanding performance in space heating but also provides domestic hot water with high efficiency. Additionally, cooling operation for summer can also be provided installing the dedicated “Cooling kit” accessory of HITACHI.

The system is simple to control; its new user controller (PC-ARFHE) improves the acclaimed and successful design used with the existing LCD controller and provides a great deal of new functions like: wizard start-up configuration, auto cool/heat, improved timer, etc.

1.1.2.1 Overview of YUTAKI system

The wide range of YUTAKI products is basically divided in two types of system:

- Split system
- Monobloc system

◆ Split system - YUTAKI S, YUTAKI S COMBI, YUTAKI S80

It consists of one outdoor unit and one indoor unit. The outdoor unit extracts the heat present in the air, increases its refrigerant temperature and transmits it to the water circuit using the plate heat exchanger of the indoor unit, where the heat is taken to radiators (fan-coils), underfloor heating components or both (2nd temperature area).

Three types of indoor unit can be used in heating split systems:

YUTAKI S

The indoor unit of YUTAKI S is designed for space heating, in wall-mounted installation. It is convenient for new installations with low capacity requirements (Well isolated installations, high efficiency radiators...).

YUTAKI S COMBI

The indoor unit of YUTAKI S COMBI is conceived as a floor standing unit. It is prepared for heating operation as well as for domestic hot water production. For this purpose, it has a built-in domestic hot water tank available in two sizes (200 or 260 L). In line with YUTAKI S units, it meets the needs of installations with low capacity requirements.

Furthermore, special YUTAKI S COMBI models have been designed with a specific solar tank for the use of solar panels. Also, new models for the UK market that meet the UK requirements refferred in the UK Building Regulations.

YUTAKI S80

The YUTAKI S80 is a standalone indoor unit that generates hot water up to 80ºC; the hottest water temperature in the domestic heating market using renewable energy.

The extra innovation in the YUTAKI S80 lies in that it has two compressors, working in a smart cascade system, with two refrigerant cycles (R-410A and R-134a). To maximize seasonal efficiency, the second refrigerant cycle is only operated as a booster, when very high water temperature is required - the rest of the time, only one cycle is used.

The YUTAKI S80 is ideal for existing properties, in particular older installations where high water supply temperatures may be required to keep the house warm – as well as for new buildings. It is designed for the replacement of boilers, offering heating and sanitary hot water all year round, without boiler back-up.

Two different models have been designed for different purposes: one model for space heating only and the other one for space heating as well as for DHW operation. For DHW operation (optional), HITACHI offers two specific YUTAKI S80 DHW tanks (DHWS200S-2.7H2E and DHWS260S-2.7H2E) which may be placed on top of the indoor unit or besides it, as an integrated unit to provide high-temperature domestic hot water enjoying the benefits of the high efficiency of the heat pump.

◆ Monobloc system - YUTAKI M

YUTAKI M is a monobloc air to water heat pump system composed by only an special outdoor unit, which carries out the function of an air-to-water heat pump. This results in an excellent solution when installation space available is limited.

YUTAKI M is designed to be installed outdoors, in any kind of dwelling (house, apartment, villa,…), whether in a new construction or in an existing building. Installation work is greatly simplified thanks to the lack of refrigerant piping connections.

1.1.2.2 Summary of operations

Space heating

YUTAKI units are factory-supplied ready for space heating operation. Different heating installation configurations can be selected, providing a comfortable atmosphere all year long, even in the coldest climates:

- ***Mono-valent system***
  The air to water heat pump is sized to provide 100% of the heating requirements on the coldest day the year.
- ***Mono-energy system***
  This is the most popular configuration. The air to water heat pump is sized to provide 80% of the heating requirements on the coldest days of the year. An auxiliary electric heater is used to provide the additional heating required on cold days. This option usually results in an ideal balance between installation costs and future energy consumption, as proven by its popularity in colder climates than ours, such as Sweden and Norway.
- ***Alternating Bi-valent system***
  For installations with an existing heating system by boiler and when is needed to heat the supplied water temperature to the circuit up to high temperatures (80ºC), the boiler can be configured to alternate with the air to water heat pump.

Selecting the different configuration types it is possible to adapt the system to all customer requirements, providing a wide application range from the simplest configuration to complete configuration: Radiator, heating floor or both (2nd temperature area).

Domestic hot water production

YUTAKI models also give the option of domestic hot water production, allowing the user to benefit from the heat pump's high efficiency and achieve domestic hot water.

This is made possible by a domestic hot water tank. In case of YUTAKI S COMBI, the domestic hot water tank is built in the indoor unit. In YUTAKI S80, a specific DHW tank is designed for combination with the indoor unit. For YUTAKI S and YUTAKI M, the HITACHI accessory "DHWT-(200/260)S-3.0H2E" can be used for the production of DHW.

An electric heater is incorporated inside the tank in order to allow an inmediate heating of the domestic hot water in accordance with the user's needs.

Space cooling

YUTAKI units can also be operated in cooling operation The dedicated "Cooling kit" accessory has been designed for this purpose. Combining the heating only models with these cooling kits, the reversible models become available. In this case, combination with fan-coils, refreshing floor or both (2nd temperature area) can be applied.

Combination with solar panels

YUTAKI system can be combined with solar panel. The solar combination enables to heat up the DHW by means of the sun. The solar combination is designed to transfer the heat from the solar panels (sun radiation) to the heat exchanger of DHW tank.

In case of YUTAKI S COMBI, a specific model with integrated tank for solar combination has been designed, as explained before.

Swimming pool water heating operation

For summer session period, YUTAKI system can be used to heat up the water temperature of swimming pools up to a value between 24 and 33ºC.

1.2 Applied symbols

During normal air conditioning 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.

⚠ DANGER

- ***The text following this symbol contains information and instructions relating directly to your safety.***
- ***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.*
- *Not taking these instructions into account could lead to minor injuries to you and others.*
- *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 Norms and Regulations

Following Regulation EU No. 517/2014 on Certain Fluorinated Greenhouse gases, it is mandatory to fill in the label attached to the unit with the total amount of refrigerant charged on the installation.

Do not vent R410A / R134a into the atmosphere: R410A / R134a are fluorinated greenhouse gases covered by the Kyoto protocol global warming potential (GWP) R410A = 2088 / R134a = 1430.

Tn of CO_2 equivalent of fluorinated greenhouse gases contained is calculated by indicated GWP * Total Charge (in kg indicated in the product label and divided by 1000.

Appropriate refrigerant

The refrigerant used in each unit is identified on the specification label and manuals of the unit. HITACHI shall not be held liable for any failure, trouble, malfunction or accident caused by units illegally charged with refrigerants other than the specified one.

Consequences of charging non-specified refrigerant

It may cause mechanical failure, malfunction and other accidents. It may cause operational failure of protection and safety devices of air conditioners. It may also cause lubrication failure of the sliding part of the compressor due to deterioration of refrigerant oil.

In particular, hydrocarbon refrigerants (such as propane, R441A, R443A, GF-08, etc.) are not allowed, since these are combustible and may cause major accidents such as fire and explosion in case of improper handling.

Once a non-specified refrigerant has been charged, no further servicing (including draining of refrigerant) shall be performed, even in case of malfunction. Improper handling of refrigerant may be a cause of fire and explosion, and servicing in such cases may be considered an illegal act.

End clients and costumers shall be informed that servicing is not approved, and the installer who charged the nonspecified refrigerant shall be asked to fix the unit.

HITACHI will accept no responsibility for units that have been charged with non-specified refrigerant once.

1.4 Product guide

1.4.1 Classification of the units

1.4.1.1 Split system - Outdoor unit

Unit type: Outdoor unit (Split air system)								
	Position-separating hyphen (fixed)							
		Compressor power (HP): 2, 2.5, 3, 4, 5, 6, 8, 10.						
			For water combination					
				Heat pump				
					V: Single phase unit (1~ 230V 50Hz) —: Three phase unit (3N~ 400V 50Hz)			
						R410A refrigerant		
							Premium series	
								E: Made in Europe —: Made in Japan
RAS	-	X	W	H	(V)	N	P	(E)

1.4.1.2 Split system - Indoor unit

◆ YUTAKI S

Unit type: YUTAKI S (Split system - Single water module (Indoor unit) - Medium/Low temperature)							
	Position-separating hyphen (fixed)						
		Compressor power of the combined outdoor unit (HP): 2.0, 2.5, 3.0, 4.0, 5.0, 6.0, 8.0, 10.0.					
			—: Heating only C: Reversible				
				R410A refrigerant			
					Made in Europe		
						-W: Without LCD Controller (sold separately as accessory)	
RWM	-	X.X	(X)	N	E	(-W)	

◆ YUTAKI S COMBI

Unit type: YUTAKI S COMBI (Split system - Dual water module (Indoor unit + Domestic hot water tank) - Medium/Low temperature)											
	Position-separating hyphen (fixed)										
		Compressor power of the combined outdoor unit (HP): 2.0, 2.5, 3.0, 4.0, 5.0, 6.0.									
			R-410A refrigerant								
				Water-to-water DHW heat exchanger							
					— : Standard model S : Model for solar combination						
						Made in Europe					
							Position-separating hyphen (fixed)				
								Tank model: 200/260 L			
									Tank material: Stainless steel		
										-K: Model for UK market	
											-W: Without LCD Controller (sold separately as accessory)
RWD	-	X.X	N	W	(X)	E	-	XXX	S	(-K)	(-W)

◆ YUTAKI S80

Indoor unit

Unit type: YUTAKI S80 (Split system - Single water module (Indoor unit) - High & Very High temperature)

	Position-separating hyphen (fixed)						
		Compressor power (HP): 4.0, 5.0, 6.0.					
			V: Single phase unit (1~ 230V 50Hz) —: Three phase unit (3N~ 400V 50Hz)				
				R-410A refrigerant			
					R-134a refrigerant		
						—: Type1: Version for operation in DHW with a remote tank W: Type2: Version for operation with HITACHI DHW tank	
							Made in Europe
RWH	-	X.X	(V)	N	F	(W)	E

Domestic hot water tank (For combination with YUTAKI S80 indoor unit standalone version)

Unit type: YUTAKI S80 domestic hot water tank

	Model: 200/260 L						
		Tank material: Stainless steel					
			Position-separating hyphen (fixed)				
				Electric heater of 2.7 kW			
					Series		
						Made in Europe	
							-W: Without LCD Controller (sold separately as accessory)
DHWS	XXX	S	-	2.7H	2	E	(-W)

1.4.1.3 Monobloc system

◆ YUTAKI M

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

	Position-separating hyphen (fixed)					
		Compressor power (HP): 3.0, 4.0, 5.0, 6.0.				
			V: Single phase unit (1~ 230V 50Hz) —: Three phase unit (3N~ 400V 50Hz)			
				R410 refrigerant		
					Made in Europe	
RASM	-	X.X	(V)	N	E	

1.4.1.4 Complementary system

◆ YUTAKI CASCADE CONTROLLER

Air to water

	Position-separating hyphen (fixed)				
		YUTAKI CASCADE CONTROLLER			
			Position-separating hyphen (fixed)		
				Language pack	
ATW	-	YCC	-	(01-02)	

1.4.2 Product guide

1.4.2.1 Split system - Outdoor unit

1~ 230V 50Hz				3N~ 400V 50Hz	
Unit	Code	Unit	Code	Unit	Code
RAS-2WHVNP	60288672	-	-	-	-
RAS-2.5WHVNP	60288673	-	-	-	-
RAS-3WHVNP	60288674	-	-	-	-
-	-	RAS-4WHVNPE	7E350007	RAS-4WHNPE	7E350107
-	-	RAS-5WHVNPE	7E350008	RAS-5WHNPE	7E350108
-	-	RAS-6WHVNPE	7E350009	RAS-6WHNPE	7E350109
-	-	-	-	RAS-8WHNPE	7E350110
-	-	-	-	RAS-10WHNPE	7E350111
					

1.4.2.2 Split system - Indoor unit

◆ YUTAKI S

(☀) (▥) (🚿) (🛁) (🏭) (❄)							
1~ 230V 50Hz				3N~ 400V 50Hz			
Unit	Code	Unit	Code	Unit	Code	Unit	Code
RWM-2.0NE RWM-2.0NE-W	7E475003 7E475103	-	-	-	-	-	-
RWM-2.5NE RWM-2.5NE-W	7E475004 7E475104	-	-	-	-	-	-
RWM-3.0NE RWM-3.0NE-W	7E475005 7E475105	-	-	-	-	-	-
-	-	RWM-4.0NE RWM-4.0NE-W	7E475007 7E475107	RWM-4.0NE RWM-4.0NE-W	7E475007 7E475107	-	-
-	-	RWM-5.0NE RWM-5.0NE-W	7E475008 7E475108	RWM-5.0NE RWM-5.0NE-W	7E475008 7E475108	-	-
-	-	RWM-6.0NE RWM-6.0NE-W	7E475009 7E475109	RWM-6.0NE RWM-6.0NE-W	7E475009 7E475109	-	-
-	-	-	-	-	-	RWM-8.0NE RWM-8.0NE-W	7E475010 7E475110
-	-	-	-	-	-	RWM-10.0NE RWM-10.0NE-W	7E475011 7E475111
							

NOTE

Icons between brackets mean possible extra operations to the factory-supplied operations. For cooling operation, refer to the Cooling kit accessory for YUTAKI S units.

◆ YUTAKI S COMBI

NOTE

Icons between brackets mean possible extra operations to the factory-supplied operations. For cooling operation, refer to the Cooling kit accessory for YUTAKI S COMBI units.

Standard model

1~ 230V 50Hz		3N~ 400V 50Hz	
Unit	Code	Unit	Code
RWD-2.0NWE-200S RWD-2.0NWE-200S-W	7E483003 7E483103	-	-
RWD-2.0NWE-260S RWD-2.0NWE-260S-W	7E483016 7E483116	-	-
RWD-2.5NWE-200S RWD-2.5NWE-200S-W	7E483004 7E483104	-	-
RWD-2.5NWE-260S RWD-2.5NWE-260S-W	7E483017 7E483117	-	-
RWD-3.0NWE-200S RWD-3.0NWE-200S-W	7E483005 7E483105	-	-
RWD-3.0NWE-260S RWD-3.0NWE-260S-W	7E483018 7E483118	-	-
RWD-4.0NWE-200S RWD-4.0NWE-200S-W	7E483007 7E483107	RWD-4.0NWE-200S RWD-4.0NWE-200S-W	7E483007 7E483107
RWD-4.0NWE-260S RWD-4.0NWE-260S-W	7E483020 7E483120	RWD-4.0NWE-260S RWD-4.0NWE-260S-W	7E483020 7E483120
RWD-5.0NWE-200S RWD-5.0NWE-200S-W	7E483008 7E483108	RWD-5.0NWE-200S RWD-5.0NWE-200S-W	7E483008 7E483108
RWD-5.0NWE-260S RWD-5.0NWE-260S-W	7E483021 7E483121	RWD-5.0NWE-260S RWD-5.0NWE-260S-W	7E483021 7E483121
RWD-6.0NWE-200S RWD-6.0NWE-200S-W	7E483009 7E483109	RWD-6.0NWE-200S RWD-6.0NWE-200S-W	7E483009 7E483109
RWD-6.0NWE-260S RWD-6.0NWE-260S-W	7E483022 7E483122	RWD-6.0NWE-260S RWD-6.0NWE-260S-W	7E483022 7E483122



Model for solar combination

1~ 230V 50Hz		3N~ 400V 50Hz	
Unit	Code	Unit	Code
RWD-2.0NWSE-260S RWD-2.0NWSE-260S-W	7E483316 7E483416	-	-
RWD-2.5NWSE-260S RWD-2.5NWSE-260S-W	7E483317 7E483417	-	-
RWD-3.0NWSE-260S RWD-3.0NWSE-260S-W	7E483318 7E483418	-	-
RWD-4.0NWSE-260S RWD-4.0NWSE-260S-W	7E483320 7E483420	RWD-4.0NWSE-260S RWD-4.0NWSE-260S-W	7E483320 7E483420
RWD-5.0NWSE-260S RWD-5.0NWSE-260S-W	7E483321 7E483421	RWD-5.0NWSE-260S RWD-5.0NWSE-260S-W	7E483321 7E483421
RWD-6.0NWSE-260S RWD-6.0NWSE-260S-W	7E483322 7E483422	RWD-6.0NWSE-260S RWD-6.0NWSE-260S-W	7E483322 7E483422



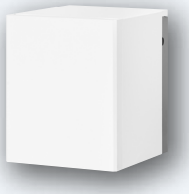
Model for UK market

1~ 230V 50Hz		3N~ 400V 50Hz	
Unit	Code	Unit	Code
RWD-2.0NWE-200(S)-K	7E483203	-	-
RWD-2.0NWE-260(S)-K	7E483216	-	-
RWD-2.5NWE-200(S)-K	7E483204	-	-
RWD-2.5NWE-260(S)-K	7E483217	-	-
RWD-3.0NWE-200(S)-K	7E483205	-	-
RWD-3.0NWE-260(S)-K	7E483218	-	-
RWD-4.0NWE-200(S)-K	7E483207	RWD-4.0NWE-200(S)-K	7E483207
RWD-4.0NWE-260(S)-K	7E483220	RWD-4.0NWE-260(S)-K	7E483220
RWD-5.0NWE-200(S)-K	7E483208	RWD-5.0NWE-200(S)-K	7E483208
RWD-5.0NWE-260(S)-K	7E483221	RWD-5.0NWE-260(S)-K	7E483221
RWD-6.0NWE-200(S)-K	7E483209	RWD-6.0NWE-200(S)-K	7E483209
RWD-6.0NWE-260(S)-K	7E483222	RWD-6.0NWE-260(S)-K	7E483222



YUTAKI S80

Indoor unit

TYPE 1: Version for operation in DHW but with a remote tank (Tank cannot be plugged on top of the unit)				TYPE 2: Version for operation with HITACHI DHW tank (Tank can be plugged on top of the unit or next to it)			
1~ 230V 50Hz		3N~ 400V 50Hz		1~ 230V 50Hz		3N~ 400V 50Hz	
Unit	Code	Unit	Code	Unit	Code	Unit	Code
RWH-4.0VNFE	7E482207	RWH-4.0NFE	7E482307	RWH-4.0VNFWE	7E482007	RWH-4.0NFWE	7E482107
RWH-5.0VNFE	7E482208	RWH-5.0NFE	7E482308	RWH-5.0VNFWE	7E482008	RWH-5.0NFWE	7E482108
RWH-6.0VNFE	7E482209	RWH-6.0NFE	7E482309	RWH-6.0VNFWE	7E482009	RWH-6.0NFWE	7E482109
							

YUTAKI S80 domestic hot water tank

1~ 230V 50Hz			
Unit	Code	Unit	Code
DHWS200S-2.7H2E DHWS200S-2.7H2E-W	7E544104 7E544106	DHWS260S-2.7H2E DHWS260S-2.7H2E-W	7E544105 7E544107
			

NOTE

- *In "TYPE 1: Version for operation in DHW but with a remote tank", the required unit controller(PC-ARFHE) has to be ordered as accessory.*
- *In "TYPE 2: Version for operation with HITACHI DHW tank", the domestic hot water tank of model DHWS200S-2.7H2E(-W) or DHWS260S-2.7H2E(-W) is required. The DHW tank has to be ordered separately. The unit controller (PC-ARFHE) is factory supplied with DHWS200S-2.7H2E and DHWS260S-2.7H2E models(integrated in the front cover). The tank can be installed in 2 ways: on top of the indoor unit (integrated installation) or next to it. In this second case, the specific accessory kit installation (ATW-FWP-02, ordered as an accessory) is required.*
- *Icons between brackets mean possible extra operations to the factory-supplied operations.*

1.4.2.3 Monobloc system

◆ YUTAKI M

1~ 230V 50Hz				3N~ 400V 50Hz	
Unit	Code	Unit	Code	Unit	Code
RASM-3VNE	7E351005	-	-	-	-
-	-	RASM-4VNE	7E351007	RASM-4NE	7E351107
-	-	RASM-5VNE	7E351008	RASM-5NE	7E351108
-	-	RASM-6VNE	7E351009	RASM-6NE	7E351109





NOTE

The required unit controller (PC-ARFHE) has to be ordered as an accessory.

1.4.2.4 Complementary system

◆ YUTAKI CASCADE CONTROLLER

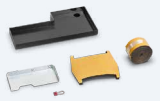
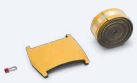
Unit	Name	Code
ATW-YCC-01	YUTAKI CASCADE CONTROLLER (Languages EN, ES, DE, FR, IT, PT, SL)	7E549949
ATW-YCC-02	YUTAKI CASCADE CONTROLLER (Languages EN, DA, SV, FI, NL, HR, EL)	7E549950



1.4.3 Accessory code list

Model	Ref.
For all series	A
For YUTAKI S units	S
For YUTAKI S COMBI units	SC
For YUTAKI S80 units	S80
For YUTAKI M units	M
For YUTAKI CASCADE CONTROLLER	YCC

◆ Cooling kit accessories

Accessory	Ref.	Name	Code	Figure
ATW-CKS-01	S	Cooling operation kit for YUTAKI S (For 2.0-3.0HP)	7E549927	
ATW-CKS-02	S	Cooling operation kit for YUTAKI S (For 4.0-6.0HP)	7E549928	
ATW-CKS-03	S	Cooling operation kit for YUTAKI S (For 8.0/10.0HP)	7E549929	
ATW-CKSC-01	SC	Cooling operation kit for YUTAKI S COMBI	7E549930	
ATW-CKM-01	M	Cooling operation kit for YUTAKI M	7E549931	

◆ Control accessories

Accessory	Ref.	Name	Code	Figure
PC-ARFHE	A	Unit controller Wired room thermostat for YUTAKI units (Languages EN, ES, DE, FR, IT, PT, SL)	7E543002	
PC-ARFHE-02	A	Unit controller Wired room thermostat for YUTAKI units (Languages EN, DA, SV, FI, NL, HR, EL)	7E543006	
ATW-RTU-04	A	Wireless ON/OFF thermostat (Receiver + Room thermostat)	7E543003	

Accessory	Ref.	Name	Code	Figure
ATW-RTU-05	A	Wireless Intelligent thermostat (Receiver + Room thermostat)	7E543004	
ATW-RTU-06	A	Wireless Intelligent thermostat for 2nd circuit (Only Room thermostat. For Intelligent thermostat application)	7E543005	
ATW-MBS-02	A	MODBUS gateway for YUTAKI units	7E549924	
ATW-KNX-02	S SC S80 M	KNX interface for YUTAKI units	7E549925	
ATW-TAG-02	S SC S80 M	Home automation gateway for YUTAKI units	70549926	
ATW-AOS-02	A	Auxiliary output signal box (Relay board for additional output signals)	7E549935	
ATW-MAK-01	A	Kit for 4-20 mA application	7E549933	
ATW-YMM-01	M	Remote control box for YUTAKI M	7E549936	
AHP-SMB-01	A	SmartBox (Hi-Box)	70549919	
ATW-FCP-01	S SC S80	Unit controller cover	7E549938	

◆ Temperature sensor accessories

Accessory	Ref.	Name	Code	Figure
ATW-2OS-02	A	2nd. outdoor temperature sensor	9E500017	
ATW-ITS-01	A	Indoor wired room temperature sensor	7E549932	
ATW-WTS-02Y	A	Universal water temperature sensor	9E500004	

◆ Water circuit accessories

Accessory	Ref.	Name	Code	Figure
NEW ATW-2TK-06	SC	2nd zone mixing kit (Integrable in YUTAKI S COMBI 200 L model)	7E549951	
NEW ATW-2TK-07	A	2nd zone mixing kit (Wall mounted model)	7E549952	
DHWT-200S-3.0H2E	S M S80 (Type 1)	Domestic hot water tank (200 L)	70544002	
DHWT-300S-3.0H2E		Domestic hot water tank (300 L)	70544003	
ATW-FWP-02	S80 (Type 2)	Kit for installation with tank beside the indoor unit	7E549934	
ATW-HSK-01	S SC S80 M	Hydraulic separator	7E549905	
ATW-AQT-01	A	Aquastat security	7E549907	
ATW-3WV-01	A	3-way valve (Internal thread and spring return)	7E549906	

Accessory	Ref.	Name	Code	Figure
ATW-WCV-01	A	Water check valve	9E500014	
WEH-6E	S80 M	Water electric heater	90500002	
ATW-DPOV-01	A	Differential pressure overflow valve	7E549916	
ATW-FWP-03	S80	Flexible water pipe	7E549937	

2. Features and benefits

Index

2.1 Selection benefits 18
2.1.1 Wide selection range 18
2.1.2 High efficiency system. Wide capacity range 21
2.1.3 Wide range of accessories and components 21
2.2 Installation benefits 28
2.2.1 YUTAKI S compact dimensions 28
2.2.2 YUTAKI S80 connection options 29
2.2.3 YUTAKI S COMBI 29
2.2.3.1 New mixing kits ATW-2TK-06 and ATW-2TK-07 29
2.3 Maintenance benefits 31
2.3.1 Filter + for the water circuit 31
2.4 Control features 32
2.4.1 Unit controller: more functions 32
2.4.2 I/O and sensor functions 32
2.5 Complementary system - YUTAKI CASCADE CONTROLLER 33
2.5.1 Multi configurations 33
2.5.2 Installation benefits 34
2.5.3 Maintenance benefits 36
2.5.4 Control features 36
2.5.5 CASCADE control 37
2.5.6 Rotary token control 38
2.5.7 Synchronized defrost 39

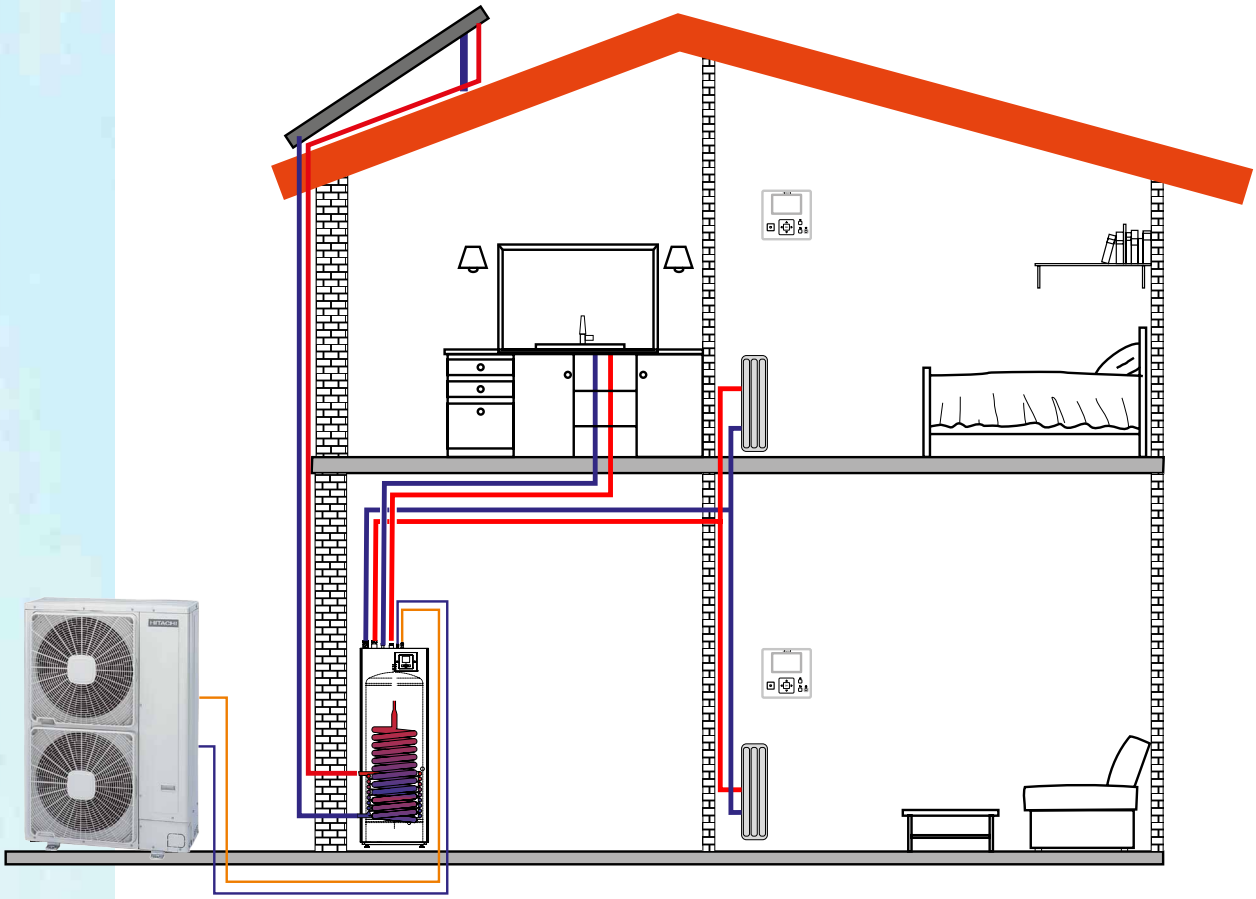
2.1 Selection benefits

2.1.1 Wide selection range

Size/Model	OUTDOOR UNIT	YUTAKI S	YUTAKI S COMBI	YUTAKI S80	YUTAKI M
2 HP				-	-
2.5 HP				-	-
3 HP				-	
4 HP					
5 HP					
6 HP					
8 HP			-	-	-
10 HP			-	-	-

◆ YUTAKI S COMBI, special model for solar combination

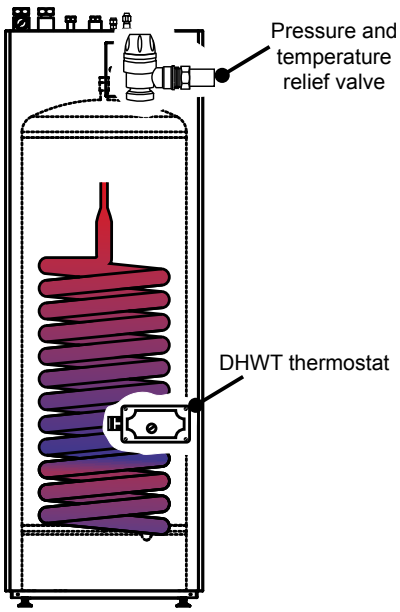
Although all YUTAKI models are ready for the use of solar panels to reduce the expenses on energy, YUTAKI S COMBI provides a tank for that purpose. A more compact solution to help to protect the environment and increase the energy efficiency.



◆ YUTAKI S COMBI, special model for UK market

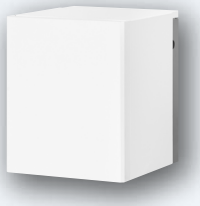
The YUTAKI S COMBI series take into account the special regulations for the UK market. These models are equipped with additional safety devices such as:

- Pressure and temperature relief valve: This device protects the internal circuit of the tank when pressure is above 7 bar and when the temperature above 96º C. When this happens, this valve will perform a discharge to an alternative circuit.
- An additional thermostat (DHWT thermostat) protects the unit from temperatures above 85º C. The thermostat switches the pump off.



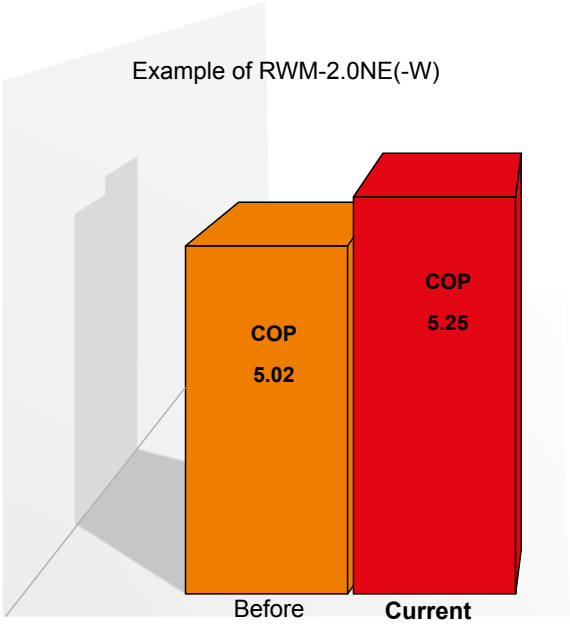
◆ YUTAKI S80: Two versions of indoor unit, improved flexibility

HITACHI offers the YUTAKI S80 series in two different versions of indoor unit ready to satisfy specific customer requirements:

<table>
<tr><th>Type</th><th>Heating</th><th colspan="2">Heating + DHW</th></tr>
<tr><td rowspan="2">1. RWH-(V)NFE
Version for operation in DHW but with a remote tank
(Tank cannot be plugged on top of the unit)</td><td rowspan="2">  </td><td colspan="2">  </td></tr>
<tr><td colspan="2">Remote DHW tank beside the indoor unit.</td></tr>
<tr><td rowspan="2">2. RWH-(V)NFWE
Version for operation with HITACHI DHW tank
(Tank can be plugged on top of the unit or next to it)</td><td rowspan="2">  </td><td>  </td><td>  </td></tr>
<tr><td>HITACHI DHW tank beside the indoor unit.</td><td>HITACHI DHW tank integrated above the indoor unit.</td></tr>
</table>

2.1.2 High efficiency system. Wide capacity range

HITACHI offers high efficiency in all YUTAKI models. The YUTAKI S 2 HP, for example, shows its heating efficiency in nominal conditions up to a 5.25, the highest versus competitors.



◆ **Better SCOP**

HITACHI increases **more than 15%** of seasonal heating efficiency from the previous versions, thanks to the state-of-the-art technology of YUTAKI outdoor and indoor units.

◆ **Bigger rated capacity**

The nominal heating capacities of the YUTAKI units have been increased **in +15%** roughly from the previous versions, providing the required capacity for any situation.

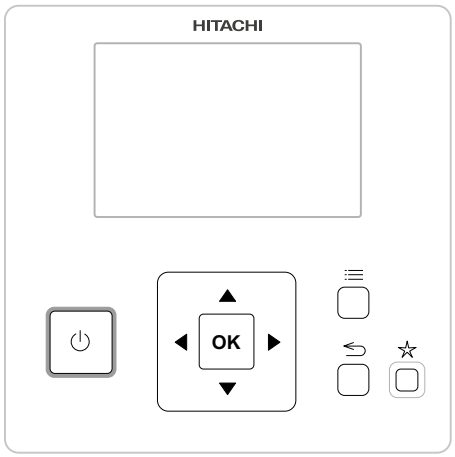
2.1.3 Wide range of accessories and components

YUTAKI models have been improved with new components and a wide range of accessories to ease the functionality and use of all the units.

◆ **Wired unit controller**

User-friendly

The wired unit controller PC-ARFHE for all HITACHI YUTAKI models is user-friendly and easy to use. It is visually pleasant and intuitive.



Multifunction

The unit controller is a multifunctional device with an updated hardware and an optimised software. Allows users to set up the unit to a wide range of possibilities.

Thermostat option (Up to 3 unit controller devices)

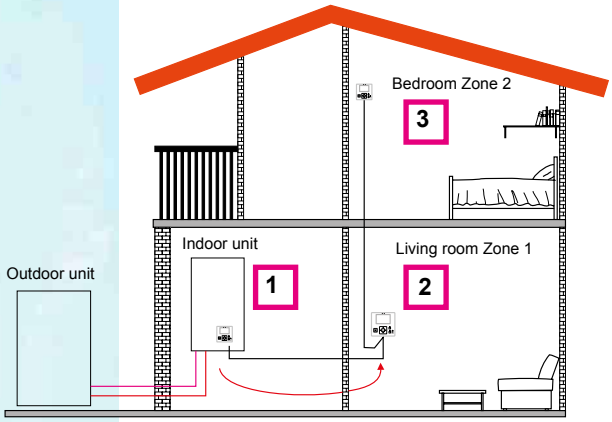
The unit controller can be used as a room thermostat. It can be removed from the front panel of the YUTAKI unit and placed anywhere it is needed, working as a thermostat to control the temperature in the area. Users can have the control of 2 different areas or even control the YUTAKI unit from 3 different places.

Unit controller supplied with the unit must always be the master type. It enables to configure parameters for the system and it can also be used as room thermostat.

OPTION 1

Use wired Unit controller PC-ARFHE + 2 thermostat option PC-ARFHE

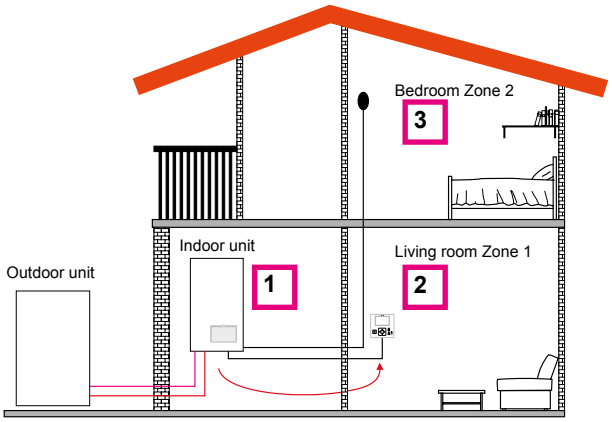
1 Master unit controller as unit configuration with possibility to move to a living room.
2 Slave Unit controller as a room thermostat for Zone 1, as accessory
3 Slave Unit controller as a room thermostat for Zone 2, as accessory



OPTION 2

Use wired Unit controller PC-ARFHE + 1 wired room sensors

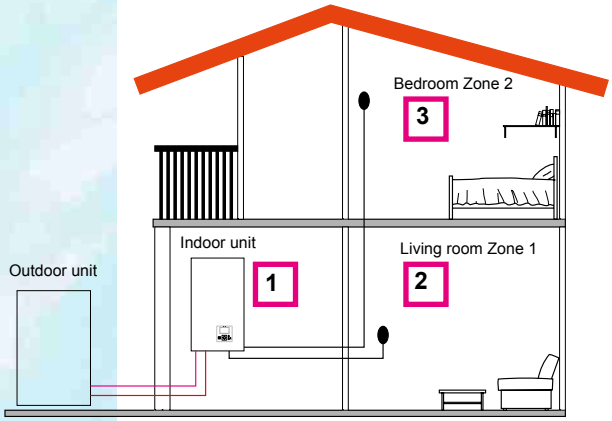
1 No unit controller in the unit
2 Master Unit controller moved to living room Zone 1
3 Wired room sensor for Zone 2



OPTION 3

Use wired Unit controller PC-ARFHE + 2 wired room sensor

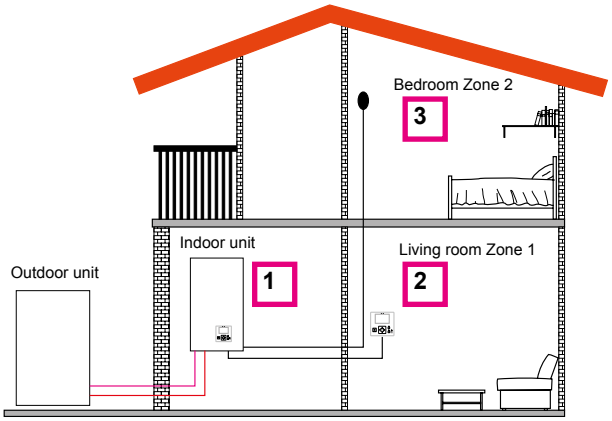
1 Master unit controller as unit configuration.
2 Wired room sensor for Zone 1
3 Wired room sensor for Zone 2



OPTION 4

Use wired Unit controller PC-ARFHE + 1 unit controller as room thermostat PC-ARFHE + 1 wired room sensor

1 Master unit controller as unit configuration.
2 Wired unit controller a room thermostat for Zone 1
3 Wired room sensor for Zone 2



NOTE

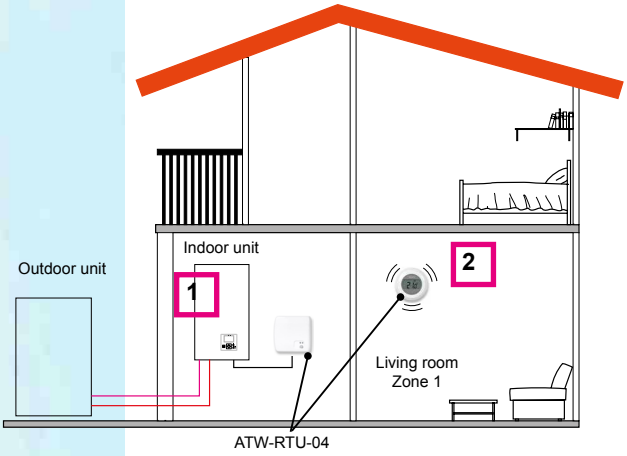
These examples are only for illustration purposes. Other types of installation configurations are possible.

◆ Wireless room thermostat

ON/OFF room thermostat unit

ON/OFF room thermostat unit is a user-friendly wireless room thermostat which informs Air-To-Water Heat Pump system when the room temperature reached the thermostat setting temperature and stops this water circuit operation.

The following illustration show the configuration applicable with the ATW-RTU-04 ON/OFF room thermostat unit.



1 Master unit controller PC-ARFHE as unit configuration.
2 ON/OFF room thermostat (ATW-RTU-04) is connected to Indoor unit as a receiver of the Intelligent room thermostat signal in zone 2.

Intelligent Room Thermostat Unit

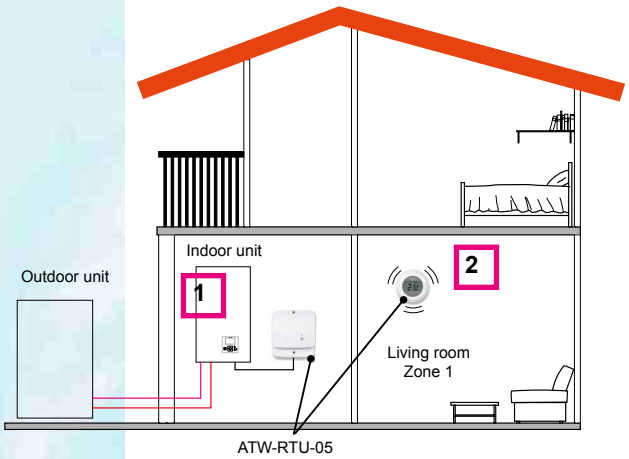
Intelligent Room Thermostat Unit is a user-friendly wireless room thermostat which informs Air-To-Water Heat Pump system about the room ambient temperature and the room set temperature in order to adjust the unit capacity considering how far is the ambient temperature.

This device is compounded of a receiver and one intelligent room unit thermostat for 1 room ambient control. It is possible to connect a second intelligent room unit thermostat (ATW-RTU-06) for a second room ambient control.

The following illustrations show different configurations applicable with the ATW-RTU-05 Intelligent room thermostat unit.

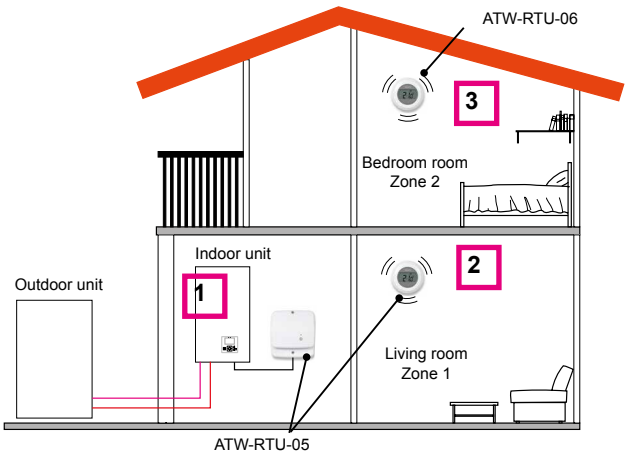
OPTION 1

1 Master unit controller PC-ARFHE as unit configuration.
2 Intelligent thermostat (ATW-RTU-05) is connected to Indoor unit as a receiver of the Intelligent room thermostat signal in zone 2.



OPTION 2

1 Master unit controller PC-ARFHE as unit configuration.
2 Intelligent thermostat (ATW-RTU-05) is connected to Indoor unit as a receiver of the Intelligent room thermostat signal from zone 2 and from zone 3.
3 Second room thermostat (ATW-RTU-06) as accessory in zone 3 for a second room ambient control.



NOTE

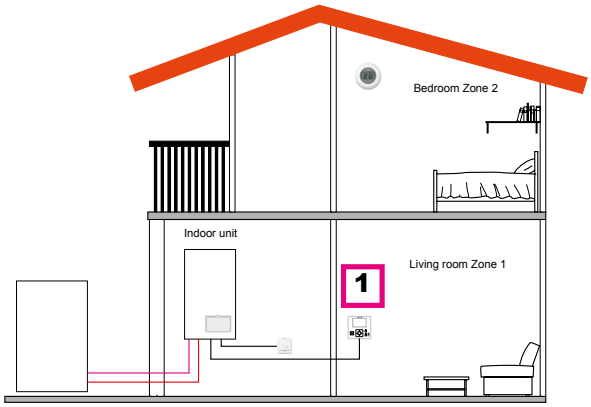
These examples are only for illustration purposes. Other types of installation configurations are possible.

◆ Mixed configurations (Wireless + Wired)

1- Move Unit controller to the living room (use as Unit controller + Room Thermostat)

2- Master unit controller moved to living room Zone

3- Wireless intelligent thermostat for zone 2 (ATW-RTU-(04-05)) (Receiver + Room thermostat)



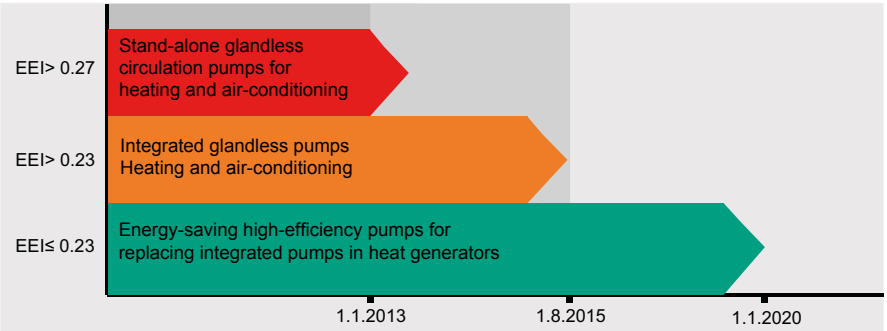
NOTE

These examples are only for illustration purposes. Other types of installation configurations are possible.

◆ ErP pumps compliant

From January 2015 the EU has legislated that all wet running circulators installed in central heating systems must conform with the ErP directive. The pump range covers many dimensions, pipe sizes and capacities for use in both existing and new applications. Fast and precise automatic capacity adjustments in response to changing operational conditions give increased energy savings. HITACHI YUTAKI pumps are ErP 2015(Tier2) compliant.

YUTAKI pumps have a reduced value of Energy Efficiency Index (EEI≤0.23), as defined by the Energy-related Products (ErP) Directive, which allows to classify these pumps as low water consumption pumps, resulting in a higher performance of the unit.



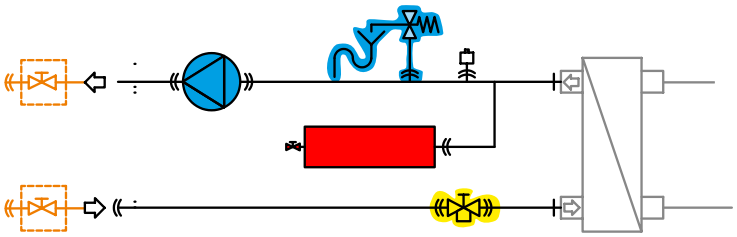
No need of water flow switch

YUTAKI pumps can read the rotation speed and the power consumption, crossing the power consumption measurement with the pump performance curves in order to know the water flow by electronic calculation. Therefore, using YUTAKI pumps, there is no need of water flow switch.

◆ YUTAKI M

The YUTAKI M series feature a more compact electrical box, an efficient heat plate exchanger (PHEX), and an optimised cycle with a built-in water pump as a default component. This complete equipment allows the YUTAKI M units to exceed every customer expectation.

YUTAKI M



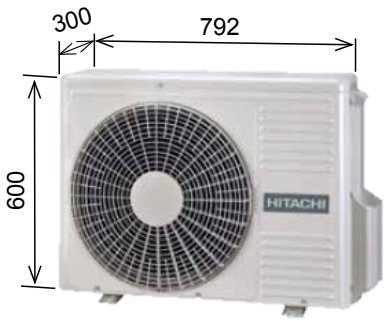
Item		After
	Water pump	Component of the YUTAKI M.
	Shut-off valve	Field supplied accessory.
	Safety valve	Component of the YUTAKI M.
	Water filter	Component of the YUTAKI M.
	Expansion vessel	Component of the YUTAKI M.

◆ More compact YUTAKI outdoor units

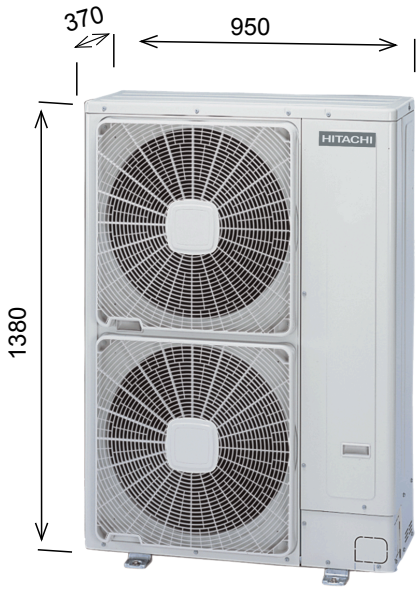
The YUTAKI outdoor units have a reduced size and weight, being compact.

Units in mm.

Example for RAS-3WHVNP (44 kg)



Example for RAS-8WHNPE (137 kg) **and RAS-10WHNPE** (139 kg)

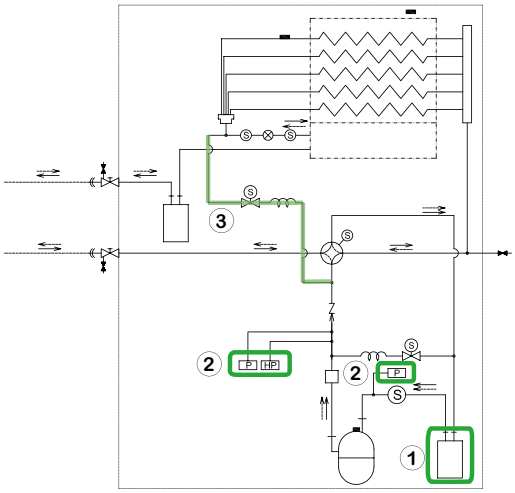


◆ Optimised refrigerant cycle

The YUTAKI models have been improved and increased the efficiency with a design of the refrigerant cycle. The cycle for RAS series has been designed in order to go one step further:

Example for (4-6)HP

RAS-(4-6)WHVNPE



1 Accumulator

The new accumulator used allows to optimise the amount of oil and refrigerant in each condition. As a result, the flexibility of combination has improved greatly.

2 Pressure control

A new pressure switch for control has been attached to the suction side of the compressor. Additionally, the high pressure switch has been replaced with a pressure sensor to ensure a more accurate compressor control.

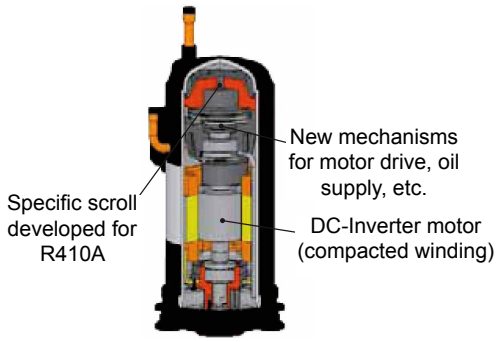
3 Hot gas bypass to the heat exchanger

Part of the discharge gas is bypassed to the heat exchanger, making use of the surplus capacity of the RAS unit when the thermal load of the indoor unit is decreased.

◆ HITACHI scroll compressor

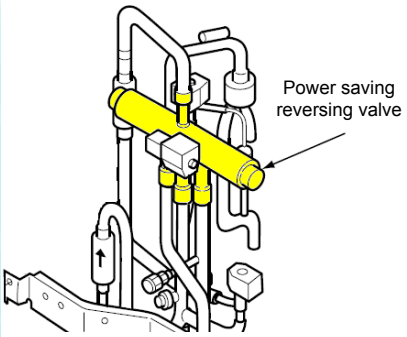
The HITACHI DC INVERTER scroll compressor has been developed to increase seasonal efficiency and reliability, while reducing power input:

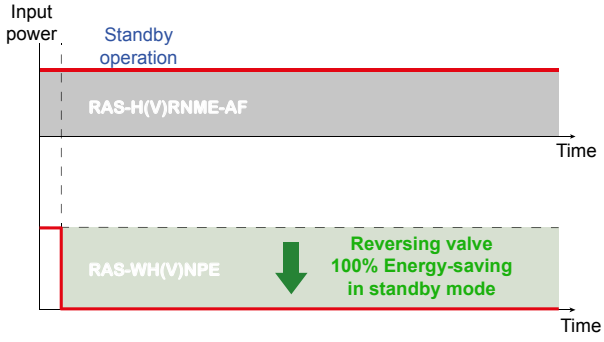
- High performance in intermediate season
- High efficiency at low speed (release valve and compacted winding of the DC INVERTER motor)



◆ Electrical energy-saving reversing valve (Only for 4-10 HP)

The reversing valve achieves an important reduction in power consumption, which is specially remarkable when the unit is not operating (in standby mode). Thus, annual electricity costs are greatly improved.





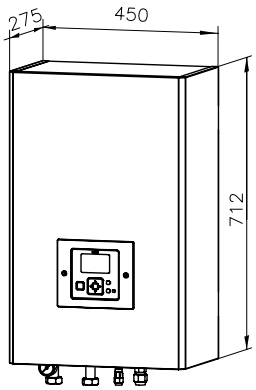
2.2 Installation benefits

2.2.1 YUTAKI S compact dimensions

YUTAKI S (2.0-3.0)HP models have a compact size and reduced weight.

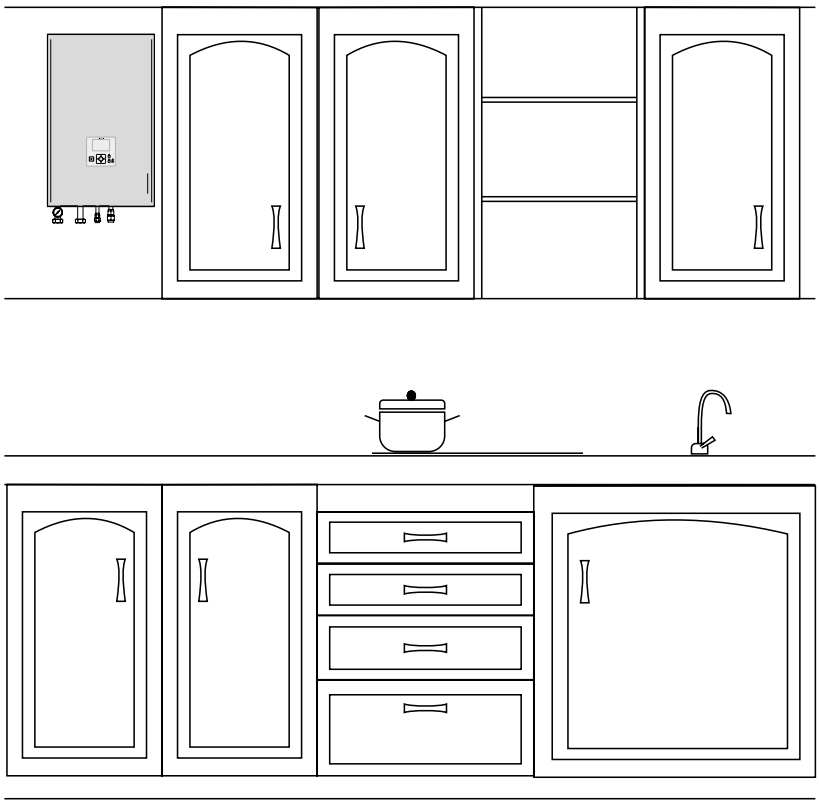
Units in mm

YUTAKI S (2.0-2.5-3.0)HP



They have the dimensions to perfectly fit inside a kitchen cupboard, for example.

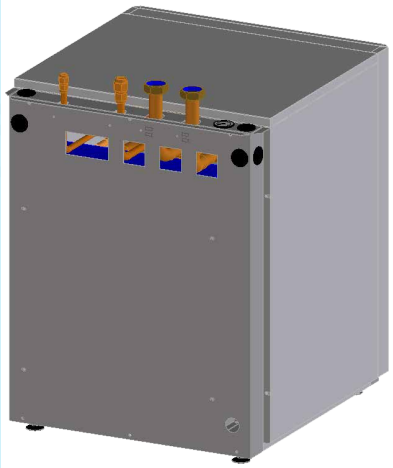
RWM-(2.0~3.0)NE(-W)



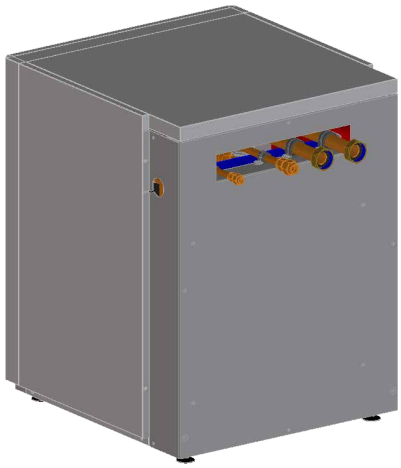
2.2.2 YUTAKI S80 connection options

Water and refrigerant connections have been improved in order to give a more safe installation thus avoiding later problems with the installation.

TYPE 1: RWH-(V)NFE



TYPE 2: RWH-(V)NFWE



Professionals can now work with more efficiency and safety thanks to the new easy-to-install units of YUTAKI S80 series.

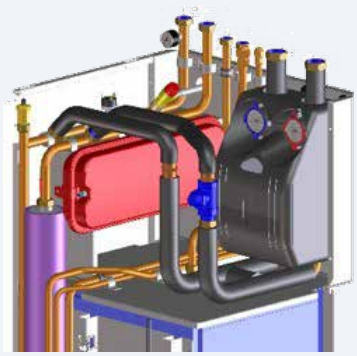
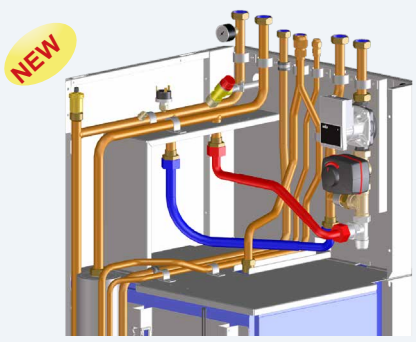
Water and refrigerant connections are now more accessible in all the models. Developers and designers have taken into account all the customers claims and specifications to match their requirements and needs.

2.2.3 YUTAKI S COMBI

2.2.3.1 New mixing kits ATW-2TK-06 and ATW-2TK-07

◆ **ATW-2TK-06 - Integrable version for YUTAKI S COMBI 200 L**

New location of connections to enhance the pipe connections and air purge procedure. Hooks on the back side of the kit to fix it more easily inside the YUTAKI S COMBI.

Current	New
	

Current ATW-2TK-03	New ATW-2TK-06
	

◆ ATW-2TK-07 - Wall mounted version

- Compactness

Current ATW-2TK-04	New ATW-2TK-07
	

2.3 Maintenance benefits

HITACHI YUTAKI series incorporates new components that make the maintenance an easier work to do. Aspects that makes the new YUTAKI series the most confident in the market:

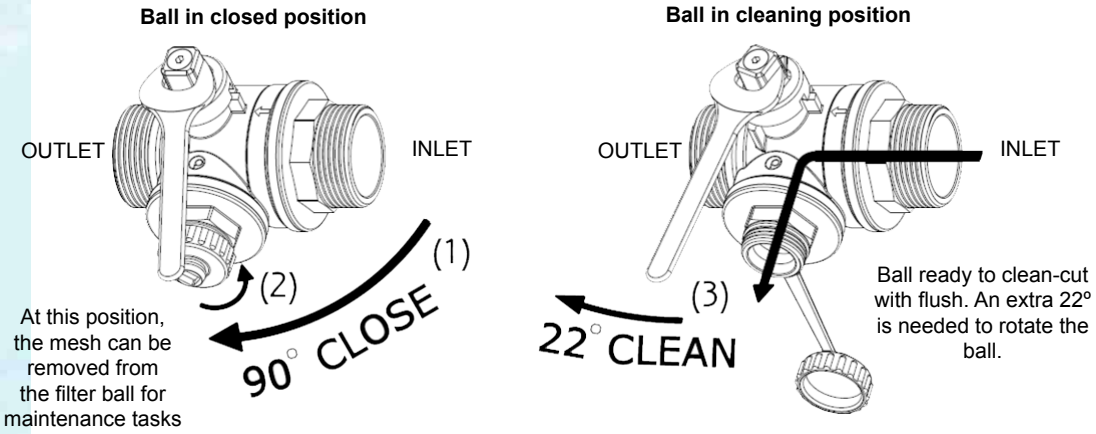
- High quality components
- Longer life cycle assets
- More reliability-centered designs
- etc.

2.3.1 Filter + for the water circuit

Filter + is an on-off ball valve containing an interchangeable cylindrical filter which is easy to inspect and remove for normal maintenance operations. A single valve therefore has two important functions: perfect sealing of the ball valves and careful filtering of the fluid, so that their great reliability protects all the components of the new HITACHI YUTAKI units.

Compared with the traditional use of three components (one filter and two shut-off valves), apart from the obvious advantages in terms of cost, installation and space, the Filter + means much smaller load losses.





2.4 Control features

2.4.1 Unit controller: more functions

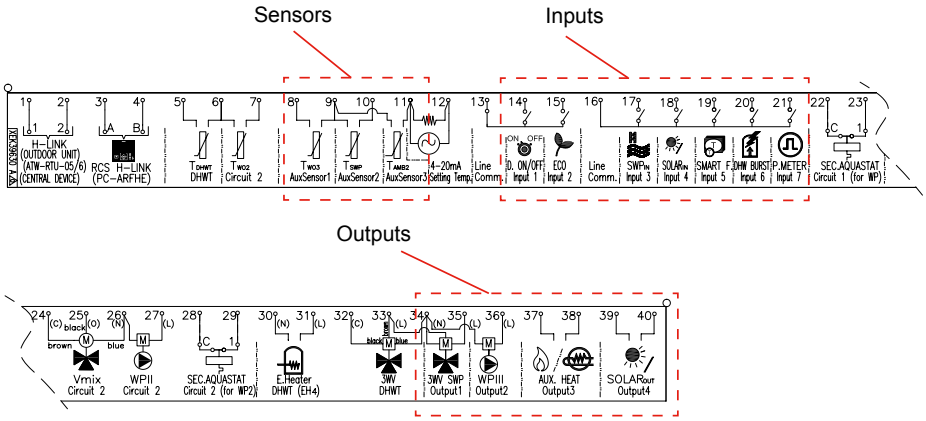
The HITACHI YUTAKI series incorporate a new unit controller which provides a great deal of functions. Some of the special functions are:

- Wizard Start-up configuration: It makes easier the Start-up of the system.
- Auto cool/heat
- Quick actions menu for more comprehensive view: Functions Timer, ECO, Status, Schedule and OTC.
- Boost action: It allows an immediate heating of the domestic hot water.
- Improved timer: Better aesthetic and function of simple timer to create easily a timer configuration.
- Air purge function for the test run.
- Many other improvements like: possibility to modify the name of the circuits, configuration of phone contact, etc.

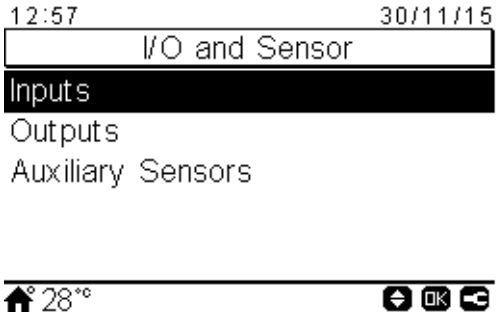
2.4.2 I/O and sensor functions

The new YUTAKI models have a wide range of configurations. Added to the factory presets, there is a wide variety of possible different input, output and sensor settings that can be performed from the unit controller.

The factory-set functions of the controller are those indicated in the label of the terminal board 2 of the indoor unit:



The following input, output and sensor functions can be selected through the “I/O and sensor“ menu of the controller:



- Inputs: Demand ON/OFF, Smart Act/SG1, Swimming pool input, Solar, Operation mode, DHW boost, Power Meter 1, Demand ON/OFF C1, Demand ON/FF C2, Forced heating, Forced cooling, Power meter 2, ECO mode C1 and C2, ECO mode C1, ECO mode C2, Forced OFF, SG 2.
- Outputs: 3-way valve swimming pool, water pump 3, Boiler, Solar pump, Alarm, Operation, Cooling, Demand-ON C1, Heating, DHW, Solar overheat, Defrost, DHW recirculation, Heater relay 1, Heater relay 2.
- Auxiliary Sensors: Two3, Swimming pool, Solar panel sensor, C1 & C2 ambient, C1 ambient, C2 ambient, Outdoor sensor (NTC).

2.5 Complementary system - YUTAKI CASCADE CONTROLLER

The YUTAKI CASCADE CONTROLLER is designed as an extension of the hydraulic control of YUTAKI range to establish a larger and efficient heating or cooling system. When YUTAKI CASCADE CONTROLLER function is active, system separate water generation (hot or cold) from water distribution and consumption.

Water generation is performed on YUTAKI Slave units, and water distribution and consumption is done on Master YUTAKI CASCADE CONTROLLER unit.

- Is a central control device capable to control slave units that produce hot or cool water.
- Is capable to control up to 8 YUTAKI outdoor/indoor units.
- Allows to control the following heating indoor unit models:
  - YUTAKI S (from 4 to 10 HP)
  - YUTAKI S COMBI (from 4 to 6 HP)
  - YUTAKI S80 (from 4 to 6 HP)
  - YUTAKI M (from 3 to 6 HP).

2.5.1 Multi configurations

The new CASCADE CONTROLLER has been designed so it can be easily installed in multiple types of system. The following examples and ilustrations are for illustrative purpose and not cover all the possible installations.

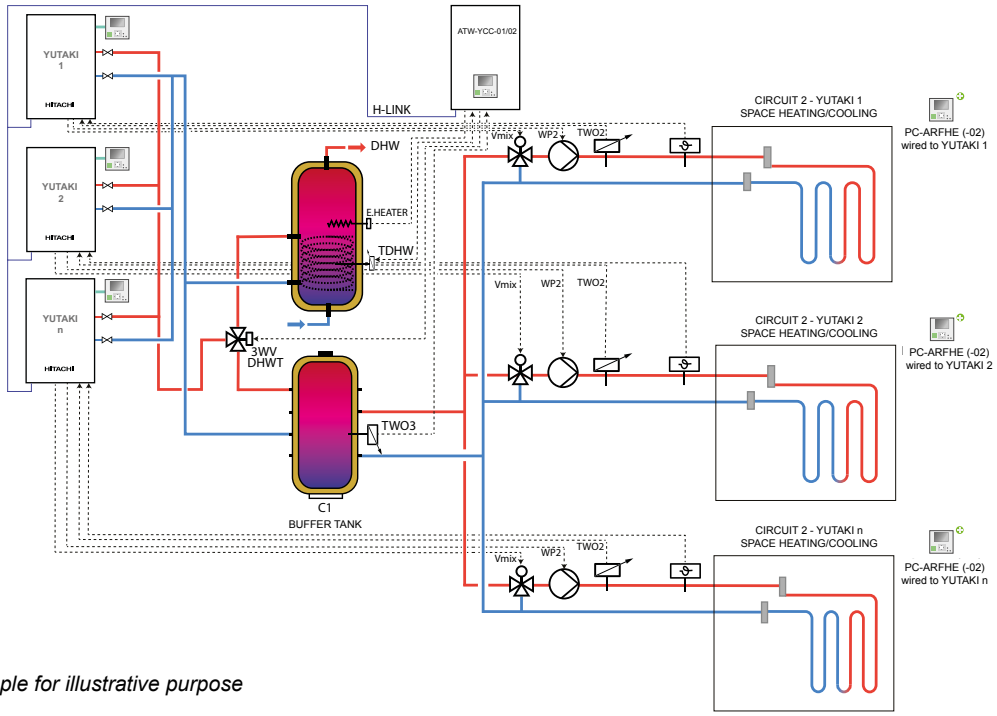
◆ Individual Heating/Cooling household in combination with common DHW production

This installation is suitable in case a high amount of DHW at a specific setting temperature is required.

When YUTAKI CASCADE CONTROLLER is generating water for DHW tank, production of hot or chilled water for Space Heating/Cooling application is stopped until DHW production stops.

In this scenario, YUTAKI CASCADE CONTROLLER manage DHW tank and Water temperature production for Space Heating or Cooling:

- C1 buffer tank depicted in the picture is C1 circuit for YUTAKI CASCADE CONTROLLER.
- C1 buffer tank is managed by means YUTAKI CASCADE CONTROLLER unit without thermostat.
- Each C2 circuit of each YUTAKI slave unit is assigned to a specific household.
- Each C2 mixing kit of each YUTAKI slave unit guarantees C2 water temperature at each household.
- Each C2 circuit can have a wired or wireless thermostat which is connected to each Slave unit
- Each C2 circuit can have an Outdoor OTC Temperature by Outdoor unit or Wired Sensor accessory.



Example for illustrative purpose

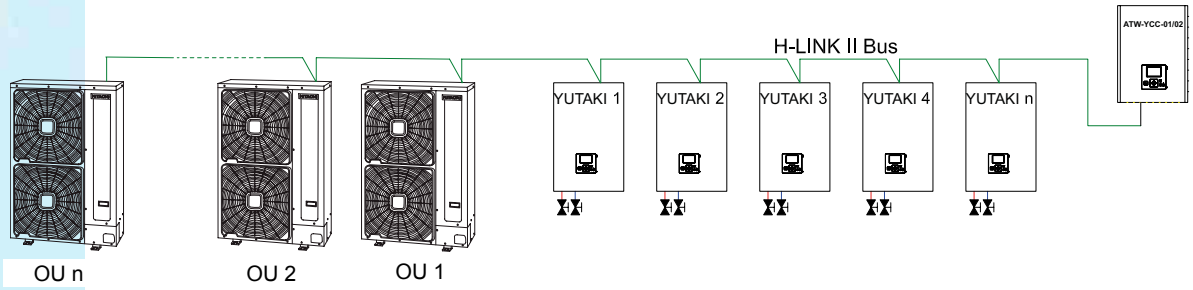
NOTE

Refer to the installation manual for more installation examples.

2.5.2 Installation benefits

◆ **H-LINK connection between YUTAKI Slave Units and the CASCADE CONTROLLER.**

The YUTAKI Units and the CASCADE CONTROLLER are interconnected through the H-LINK II bus, consisting of 2 non-polarity cables and accepting lengths of up to 1,000 m.



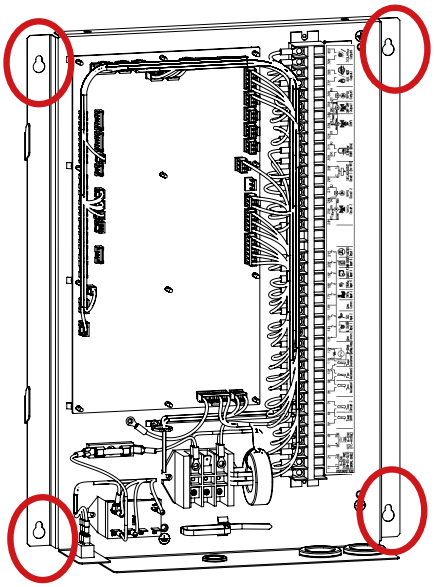
◆ **No additional device into each slave unit.**

No additional devices need to be installed into individual heat pumps.

◆ **Universal mounting concept**

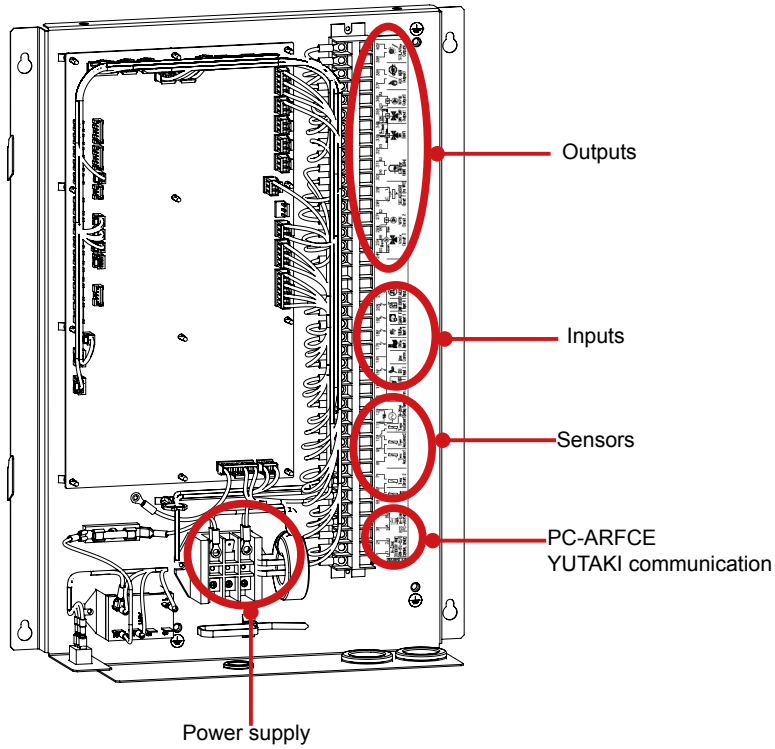
The YUTAKI CASCADE CONTROLLER is designed for direct wall mounting.

The shape of the screw holes allows to preset the screws on the wall, then placing the electrical box and finally tightening the screws.



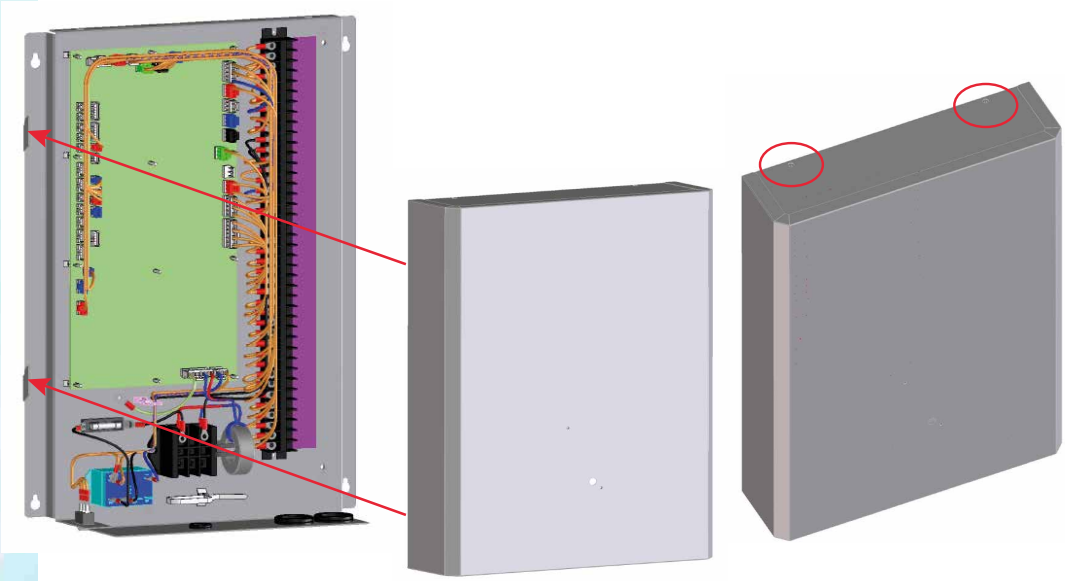
◆ Connection by areas

The connections for power supply and optional function are placed in separate areas of the terminal board.



◆ Electrical box with Easy Cover (Service cover)

The service cover can be easily placed by just fitting the holes in the cover with the tabs on the electrical box, then fixing two screws at the top side.



2.5.3 Maintenance benefits

◆ Checking of the operational data of the slave unit

The CASCADE CONTROLLER allows monitoring the status of slave units and therefore provides the user with information about the status of the whole system. The parameters that can be checked for each slave module are the following:

- Operation status for slave unit "n"
- Water inlet temperature for slave unit "n"
- Water outlet temperature for module "n"
- Outdoor unit compressor frequency for module "n"
- Status of DHW for module "n"
- Type of DHW production (Master or Slave) in case that “Status of DHW” for module "n" is “Enabled”

◆ Alarm control

The CASCADE CONTROLLER has been designed in order to manage alarm notifications generated at the CASCADE CONTROLLER side and also alarms generated at the slave unit side. In any case, both types of alarms are displayed at the bottom-left corner of the display of the LCD controller as it is done on the YUTAKI Unit.

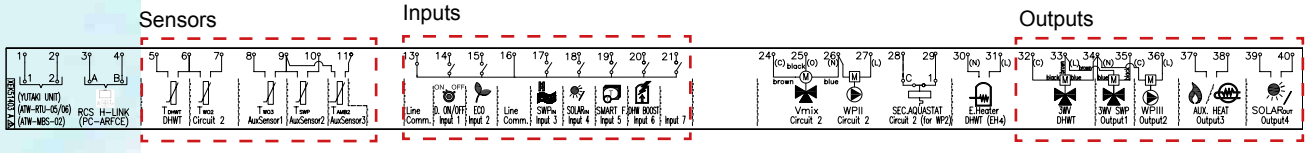
- CASCADE CONTROLLER alarms: These alarms are generated at the CASCADE CONTROLLER side. Alarms can be due to factors such as sensor abnormality, wrong setup of the CASCADE CONTROLLER, high temperature limitation, freeze protection or abnormalities related to wireless thermostats. Some of these alarms trigger protection controls allowing to continue the operation of the CASCADE CONTROLLER, while others stop the CASCADE CONTROLLER in order to protect the unit.
- Slave unit alarms: Alarms generated at the slave unit side are displayed at the LCD controller with alarm code 21X, where X indicates the number of the slave unit in which the alarm occurred. For instance, should an alarm of any kind (thermistor, flow, wireless thermostat…) occur in slave module 3, it is displayed in the LCD controller as “Alarm 213”. As a rule, operation of the CASCADE CONTROLLER is not stopped in the event of a slave unit alarm. The only case in which the operation of the CASCADE CONTROLLER is stopped due to slave unit alarms (and emergency operation starts as long as it is enabled) is when all the slave units in the system are in alarm.

2.5.4 Control features

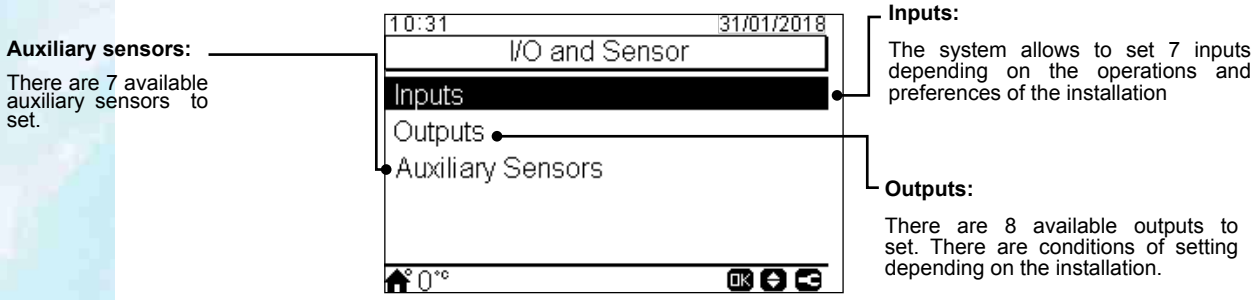
◆ I/O and sensor functions

The terminal board of the new YUTAKI CASCADE CONTROLLER allows a wide range of configurations, just as in the YUTAKI units. In addition to factory presets, the unit controller offers the possibility to adjust the detailed settings of every input, output and sensor port.

The factory default functions of the controller are those indicated in the label of terminal 2, as shown below:



The following input, output and sensor functions can be selected in the “I/O and Sensor” menu of the controller:



List of available inputs:

Disabled, Demand ON/OFF, Demand ON/OFF C1, Demand ON/OFF C2, ECO C1 + C2, ECO C1, ECO C2, Forced Off, Smart Act / SG1, Swimming Pool, Solar, Operation, DHW Boost, Forced Heating, Forced Cooling, SG2

List of available outputs:

Disabled, SWP 3WV, Water pump 3, Boiler, Solar Pump, Alarm, Operation, Cooling, Dem-ON C1, Heating, DHW, Solar overheat, Defrost, DHW Re-circulation, Heater relay 1(Only for YUTAKI S80 or YUTAKI M units), Heater relay 2(Only for YUTAKI S80 or YUTAKI M units).

List of available sensors:

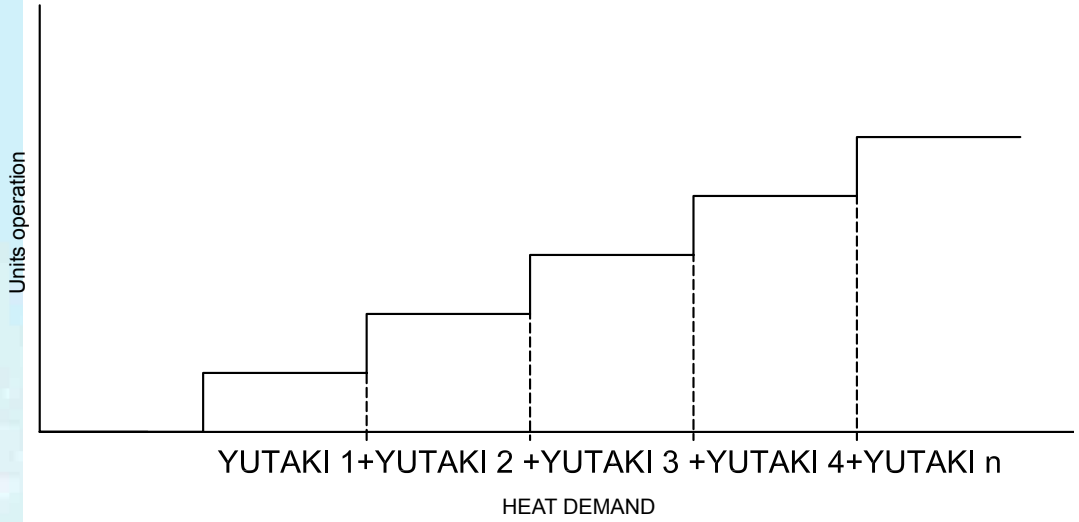
Disabled, Two3, Swimming Pool, Solar panel sensor, C1 + C2 Ambient, C1 Ambient, C2 Ambient, Outdoor sensor (NTC).

2.5.5 CASCADE control

The new CASCADE control determines whether a YUTAKI slave unit has to be switched ON or OFF according to heating demand (Water temperature and Water setting temperature).

Up to 8 basic modules can be connected to the YUTAKI CASCADE CONTROLLER.

The combination of these modules operates as a single system, and allows to achieve higher capacities.



When this control determines that a unit has to be switched ON or OFF, it is the rotary token control which determines the concrete unit to be switched ON or OFF.

2.5.6 Rotary token control

A different slave unit is started first in each heating up process, in order to balance operation between them.

In case that the CASCADE PID Control determines that a unit has to be switched ON in order to satisfy capacity requirements, the Rotary Control switches ON the “Next available Unit”.

In case that the CASCADE PID Control determines that a unit has to be switched OFF as it is no longer required to satisfy capacity requirements, the Rotary Control switches OFF the unit that had been switched ON in first place.

Example of Rotary Token Control diagram:

	Time line (1 min)	SU-1	SU-2	SU-3	SU-4	SU-5	SU-6	SU-7	SU-8
1	All Units OFF	0	0	0	0	0	0		0
2	PID determine to switch ON module. YCC switches ON next available Slave Unit	1	0	0	0	0	0		0
3	PID determine to switch ON module. YCC switches ON next available Slave Unit	1	2	0	0	0	0		0
4	PID determine to switch ON module. YCC switches ON next available Slave Unit	1	2	3	0	0	0		0
5	PID determine to switch ON module. YCC switches ON next available Slave Unit	1	2	3	4	0	0		0
6	PID determine to switch ON module. YCC switches ON next available Slave Unit	1	2	3	4	5	0		0
7	Heat Demand. PID does not determine new Unit to be started	1	2	3	4	5	0		0
8	Module 3 is in alarm. YCC switches ON new module instead	1	2		3	4	5		0
9	PID determines to switch OFF a module. YCC switches OFF first module started	0	1		2	3	4		0
10	PID determines to switch OFF a module. YCC switches OFF first module started	0	0		1	2	3		0
11	PID determines to switch ON Module. YCC switches ON next available Unit	0	0	0	1	2	3		4
12	PID determine to switch ON module. YCC switches ON next available Slave Unit	5	0	0	1	2	3		4
13	Slave Unit switches to DHW operation. DHW Slave Unit also. YCC switches ON same amount of Units	3	4	5			1	0	2
14	PID determines to switch OFF a module. YCC switches OFF first module started	2	3	4			0	0	1
15	PID determines to switch OFF a module. YCC switches OFF first module started	1	2	3	0	0	0	0	0
16	In case of Thermo OFF or Demand OFF, YCC switches OFF all modules	0	0	0	0	0	0	0	0

	Unit OFF
	Unit ON for C1
	Unit ON for Master DHW tank
	Unit ONfor Slave DHW tank
	Unit in alarm
	Disabled

2.5.7 Synchronized defrost

The defrosting process of the YUTAKI slave units operating with the Cascade Controller as a group has been improved in order to avoid the drop of heating capacity by not defrosting units at the same time.

The defrost operation of YUTAKI outdoor units connected to a Cascade Controller operating as a group is timed in order to limit the effect of the drop in heating capacity caused by simultaneous defrost. This improvement results in a more stable capacity and better comfort.

The beginning of defrosting operation of each YUTAKI outdoor unit is established according to the total number of units connected to the Cascade Controller and the individual need to defrost of each YUTAKI outdoor unit.

Number of YUTAKI units	Number of units in concurrent defrost
2 or 3	Only 1 YUTAKI can defrost
4 or 5	Only 1 YUTAKI can defrost
5 or 6	Up to 2 YUTAKI can defrost at the same time
6 or 7	Up to 2 YUTAKI can defrost at the same time
7 or 8	Up to 2 YUTAKI can defrost at the same time

3. General data

Index

3.1 Capacity tables 43
3.1.1 Nominal capacity-performance tables 43
3.1.1.1 Considerations 43
3.1.1.2 Capacity-performance data 43
3.2 ERP performance data 46
3.2.1 General considerations 46
3.2.2 General ERP data for space heaters 46
3.2.2.1 ERP data - YUTAKI S 46
3.2.2.2 ERP data - YUTAKI S COMBI 52
3.2.2.3 ERP data - YUTAKI S80 57
3.2.2.4 ERP data - YUTAKI M 62
3.2.2.5 ERP additional data - YUTAKI S 65
3.2.2.6 ERP additional data - YUTAKI S COMBI 66
3.2.2.7 ERP additional data - YUTAKI S80 67
3.2.2.8 ERP additional data - YUTAKI M 67
3.2.3 General ERP data for combi heaters (YUTAKI S COMBI & S80) 68
3.2.3.1 YUTAKI S COMBI 68
3.2.3.2 YUTAKI S80 69
3.2.4 General ERP data for hot water storage tanks (YUTAKI S , YUTAKI M & YUTAKI S 80) 69
3.3 General specifications 70
3.3.1 Considerations 70
3.3.2 Split system - Outdoor unit 71
3.3.3 Split system - Indoor unit 73
3.3.3.1 YUTAKI S 73
3.3.3.2 YUTAKI S COMBI 76
3.3.3.3 YUTAKI S80 82
3.3.4 Monobloc system - YUTAKI M 85
3.3.5 Domestic Hot Water Tank 87
3.3.6 Complementary system - YUTAKI CASCADE CONTROLLER 88
3.4 Component data 89
3.4.1 Split system - Outdoor unit 89
3.4.2 Split system - Indoor unit 91
3.4.2.1 YUTAKI S 91
3.4.2.2 YUTAKI S COMBI 92
3.4.2.3 YUTAKI S80 96
3.4.3 Monobloc system - YUTAKI M 97
3.5 Electrical data 99
3.5.1 Considerations 99

3.5.2 Split system - Outdoor unit 100
3.5.3 Split system - Indoor unit 101
3.5.3.1 YUTAKI S 101
3.5.3.2 YUTAKI S COMBI 101
3.5.3.3 YUTAKI S80 102
3.5.4 Monobloc system - YUTAKI M 104
3.5.5 Complementary system - YUTAKI CASCADE CONTROLLER 104

3.1 Capacity tables

3.1.1 Nominal capacity-performance tables

3.1.1.1 Considerations

- The heating capacity tables show the capacity and performance data in integrated values (with defrost correction factor included).
- The nominal heating and cooling capacities are based on the EN 14511 standard: Piping length: 7.5 meters; Piping lift: 0 meters.

Keywords:

- CAP: Nominal capacity (kW)
- COP: Coefficient of performance
- EER: Energy efficiency ratio
- DB: Dry bulb; WB: Wet bulb (ºC)
- OAT: Outdoor ambient temperature (ºC)
- WIT: Water inlet temperature (ºC)
- WOT: Water outlet temperature (ºC)

3.1.1.2 Capacity-performance data

◆ **YUTAKI S**

HP				2.0 HP	2.5 HP	3.0 HP	4.0 HP	5.0 HP	6.0 HP	8.0 HP	10.0 HP
Outdoor unit model				RAS-2 WHVNP	RAS-2.5 WHVNP	RAS-3 WHVNP	RAS-4 WH(V)NPE	RAS-5 WH(V)NPE	RAS-6 WH(V)NPE	RAS-8 WHNPE	RAS-10 WHNPE
Indoor unit model				RWM-2.0 NE(-W)	RWM-2.5 NE(-W)	RWM-3.0 NE(-W)	RWM-4.0 NE(-W)	RWM-5.0 NE(-W)	RWM-6.0 NE(-W)	RWM-8.0 NE(-W)	RWM-10.0 NE(-W)
OAT (DB/WB)	WIT / WOT	-	Unit	Heating operation							
7 / 6 ºC	30 / 35 ºC	CAP (Min./Nom./Max.)	kW	1.85 /4.3/7.0	1.95 /6.0/9.0	2.1/ 7.5/11.0	4.3 /11.0/15.2	4.8 /14.0/16.7	5.5 /16.0/17.8	9.0 /20.0/25.5	10.0 /24.0/32.0
		COP (Nom.)	-	5.25	4.80	4.55	5.00	4.71	4.57	4.30	4.29
	40 / 45 ºC	CAP (Nom./Max.)	kW	4.3/6.2	6.0/9.0	7.5/10.0	11.0/14.1	14.0/15.7	16.0/17.3	20.0/25.0	24.0/32.0
		COP (Nom.)	-	3.90	3.59	3.50	3.98	3.61	3.40	3.40	3.30
	47 / 55 ºC	CAP (Nom./Max.)	kW	4.3/6.0	6.0/8.0	7.5/9.2	11.0/13.5	14.0/15.2	16.0/17.0	20.0/24.0	24.0/32.0
		COP (Nom.)	-	3.00	2.89	2.57	3.00	2.80	2.50	2.72	2.65
2 / 1 ºC	30 / 35 ºC	CAP (Nom./Max.)	kW	3.5/5.5	4.5/7.0	5.5/8.9	9.5/12.8	10.5/13.9	11.1/15.0	12.3/20.0	13.0/20.7
		COP (Nom.)	-	4.10	3.65	3.53	3.61	3.55	3.41	3.41	3.31
-7 / -8 ºC	30 / 35 ºC	CAP (Nom./Max.)	kW	4.3/4.7	5.3/5.7	5.8/6.7	9.7/10.6	11.5/12.0	12.0/13.0	14.2/17.9	16.5/21.0
		COP (Nom.)	-	2.85	2.60	2.57	2.74	2.65	2.57	2.57	2.46
	40 / 45 ºC	CAP (Nom./Max.)	kW	4.3/4.6	5.0/5.5	6.0/6.4	10.0/10.0	11.0/11.6	11.5/12.5	15.0/16.6	16.5/18.5
		COP (Nom.)	-	2.45	2.25	2.25	2.45	2.25	2.15	2.08	1.74
	47 / 55 ºC	CAP (Nom./Max.)	kW	4.0/4.2	4.6/5.0	5.0/5.5	8.7/9.7	9.7/11.2	10.5/12.0	12.5/14.5	15.5/17.3
		COP (Nom.)	-	1.93	1.82	1.60	1.78	1.85	1.75	1.70	1.50

OAT (DB/WB)	WIT / WOT	-	Unit	Cooling operation (Using cooling kit accessory)							
35 / -- ºC	12 / 7 ºC	CAP (Nom/Max)	kW	3.8/4.9	5.0/5.8	6.0/7.0	7.2/11.8	9.5/12.6	10.5/13.7	14.0/16.4	17.5/20.6
		EER (Nom.)	-	3.12	3.15	2.75	3.54	3.54	3.31	3.12	2.81
	23 / 18 ºC	CAP (Nom/Max)	kW	4.1/6.1	5.5/7.4	6.0/8.5	10.4/15.0	12.9/16.0	13.5/17.5	17.0/23.5	20.0/27.0
		EER (Nom.)	-	3.81	3.81	3.81	4.50	4.02	3.81	3.81	3.61

◆ YUTAKI S COMBI

HP				2.0 HP	2.5 HP	3.0 HP	4.0 HP	5.0 HP	6.0 HP
Outdoor unit model				RAS-2 WHVNP	RAS-2.5 WHVNP	RAS-3 WHVNP	RAS-4 WH(V)NPE	RAS-5 WH(V)NPE	RAS-6 WH(V)NPE
Indoor unit model				RWD-2.0NW(S) E-(200/260) S(-K)(-W)	RWD-2.5NW(S) E-(200/260) S(-K)(-W)	RWD-3.0NW(S) E-(200/260) S(-K)(-W)	RWD-4.0NW(S) E-(200/260) S(-K)(-W)	RWD-5.0NW(S) E-(200/260) S(-K)(-W)	RWD-6.0NW(S) E-(200/260) S(-K)(-W)
OAT (DB/WB)	WIT / WOT	-	Unit	Heating operation					
7 / 6 °C	30 / 35 °C	CAP (Min./Nom./Max.)	kW	1.85 /4.3/7.0	1.95 /6.0/9.0	2.1/ 7.5/11.0	4.3 /11.0/15.2	4.8 /14.0/16.7	5.5 /16.0/17.8
		COP (Nom.)	-	5.25	4.80	4.55	5.00	4.71	4.57
	40 / 45 °C	CAP (Nom./Max.)	kW	4.3/6.2	6.0/9.0	7.5/10.0	11.0/14.1	14.0/15.7	16.0/17.3
		COP (Nom.)	-	3.90	3.59	3.50	3.98	3.61	3.40
	47 / 55 °C	CAP (Nom./Max.)	kW	4.3/6.0	6.0/8.0	7.5/9.2	11.0/13.5	14.0/15.2	16.0/17.0
		COP (Nom.)	-	3.0	2.89	2.57	3.00	2.80	2.50
2 / 1 °C	30 / 35 °C	CAP (Nom./Max.)	kW	3.5/5.5	4.5/7.0	5.5/8.9	9.5/12.8	10.5/13.9	11.1/15.0
		COP (Nom.)	-	4.10	3.65	3.53	3.61	3.55	3.41
-7 / -8 °C	30 / 35 °C	CAP (Nom./Max.)	kW	4.3/4.7	5.3/5.7	5.8/6.7	9.7/10.6	11.5/12.0	12.0/13.0
		COP (Nom.)	-	2.85	2.60	2.57	2.74	2.65	2.57
	40 / 45 °C	CAP (Nom./Max.)	kW	4.3/4.6	5.0/5.5	6.0/6.4	10.0/10.0	11.0/11.6	11.5/12.5
		COP (Nom.)	-	2.45	2.25	2.25	2.45	2.25	2.15
	47 / 55 °C	CAP (Nom./Max.)	kW	4.0/4.2	4.6/5.0	5.0/5.5	8.7/9.7	9.7/11.2	10.5/12.0
		COP (Nom.)	-	1.93	1.82	1.60	1.78	1.85	1.75

OAT (DB/WB)	WIT / WOT	-	Unit	Cooling operation (Using cooling kit accessory)					
35 / -- °C	12 / 7 °C	CAP (Nom/Max)	kW	3.8/4.9	5.0/5.8	6.0/7.0	7.2/11.8	9.5/12.6	10.5/13.7
		EER (Nom.)	-	3.12	3.15	2.75	3.54	3.54	3.31
	23 / 18 °C	CAP (Nom/Max)	kW	4.1/6.1	5.5/7.4	6.0/8.5	10.4/15.0	12.9/16.0	13.5/17.5
		EER (Nom.)	-	3.81	3.81	3.81	4.50	4.02	3.81

◆ YUTAKI S COMBI tank performance

HP				2.0 HP	2.5 HP	3.0 HP	4.0 HP	5.0V	6.0 HP	4.0 HP	5.0 HP	6.0 HP
Tank	Outdoor unit model			RAS-2 WHVNP	RAS-2.5 WHVNP	RAS-3 WHVNP	RAS-4 WHVNPE	RAS-5 WHVNPE	RAS-6 WHVNPE	RAS-4 WHNPE	RAS-5 WHNPE	RAS-6 WHNPE
	Indoor unit model			RWD-2.0 NW(S)E-(200/260) S(-K)(-W)	RWD-2.5 NW(S)E-(200/260) S(-K)(-W)	RWD-3.0 NW(S)E-(200/260) S(-K)(-W)	RWD-4.0 NW(S)E-(200/260) S(-K)(-W)	RWD-5.0 NW(S)E-(200/260) S(-K)(-W)	RWD-6.0 NW(S)E-(200/260) S(-K)(-W)	RWD-4.0 NW(S)E-(200/260) S(-K)(-W)	RWD-5.0 NW(S)E-(200/260) S(-K)(-W)	RWD-6.0 NW(S)E-(200/260) S(-K)(-W)
200 L	Load profile	-	-	L	L	L	L	L	L	L	L	L
	COP_{dhw}	-	-	3.30	3.30	3.30	3.25	3.25	3.25	3.25	3.25	3.25
	Heating up time	t_h	h:min	1:43	1:43	1:43	1:23	1:10	1:10	1:23	1:10	1:10
	Standby power input	Pes	W	0.037	0.037	0.037	0.042	0.042	0.042	0.049	0.049	0.049
	Mixed water at 40 °C	Vmax	L	263	263	263	263	263	263	263	263	263
	Ref hot water temperature	θ'wh	°C	54.00	54.00	54.00	54.00	54.00	54.00	54.00	54.00	54.00
	Efficiency	ηwh	%	132	132	132	130	130	130	130	130	130
	Energy class	-	-	A+	A+	A+	A+	A+	A+	A+	A+	A+
260 L	Load profile	-	-	XL	XL	XL	XL	XL	XL	XL	XL	XL
	COP_{dhw}	-	-	3.40	3.40	3.40	3.35	3.35	3.35	3.35	3.35	3.35
	Heating up time	t_h	h:min	2:10	2:10	2:10	1:44	1:25	1:25	1:44	1:25	1:25
	Standby power input	Pes	W	0.041	0.041	0.041	0.044	0.044	0.044	0.051	0.051	0.051
	Mixed water at 40 °C	Vmax	L	350	350	350	350	350	350	350	350	350
	Ref hot water temperature	θ'wh	°C	54.00	54.00	54.00	54.00	54.00	54.00	54.00	54.00	54.00
	Efficiency	ηwh	%	136	136	136	134	134	134	134	134	134
	Energy class	-	-	A+	A+	A+	A+	A+	A+	A+	A+	A+

◆ YUTAKI S80

HP				4.0 HP	5.0 HP	6.0 HP
Outdoor unit model				RAS-4WH(V)NPE	RAS-5WH(V)NPE	RAS-6WH(V)NPE
Indoor unit model				RWH-4.0(V)NF(W)E	RWH-5.0(V)NF(W)E	RWH-6.0(V)NF(W)E
OAT (DB/WB)	WIT / WOT	-	Unit	Heating operation		
7 / 6 °C	30 / 35 °C	CAP (Nom./Max.)	kW	11.0/15.2	14.0/16.7	16.0/17.8
		COP (Nom.)	-	5.00	4.71	4.57
	40 / 45 °C	CAP (Nom./Max.)	kW	11.0/14.5	14.0/17.0	16.0/18.0
		COP (Nom.)	-	3.90	3.78	3.60
	47 / 55 °C	CAP (Nom./Max.)	kW	11.0/14.5	14.0/17.0	16.0/18.0
		COP (Nom.)	-	3.32	3.19	3.10
	55 / 65 °C	CAP (Nom./Max.)	kW	11.0/14.5	14.0/17.0	16.0/18.0
		COP (Nom.)	-	2.90	2.88	2.73
-7 / -8 °C	30 / 35 °C	CAP (Nom./Max.)	kW	9.7/10.6	11.5/12.2	12.1/13.0
		COP (Nom.)	-	2.74	2.65	2.57
	40 / 45 °C	CAP (Nom./Max.)	kW	11.0/12.5	14.0/14.5	16.0/16.0
		COP (Nom.)	-	2.40	2.30	2.20
	47 / 55 °C	CAP (Nom./Max.)	kW	11.0/12.5	14.0/14.5	16.0/16.0
		COP (Nom.)	-	2.30	2.20	2.08
	55 / 65 °C	CAP (Nom./Max.)	kW	11.0/12.5	14.0/14.5	16.0/16.0
		COP (Nom.)	-	2.10	2.05	1.95

◆ YUTAKI M

HP				3.0 HP	4.0 HP	5.0 HP	6.0 HP
Outdoor unit model				RASM-3VNE	RASM-4(V)NE	RASM-5(V)NE	RASM-6(V)NE
OAT (DB/WB)	WIT / WOT	-	Unit	Heating operation			
7 / 6 °C	30 / 35 °C	CAP (Nom./Max.)	kW	7.5/11.0	11.0/15.2	14.0/16.7	16.0/17.8
		COP (Nom.)	-	4.55	5.00	4.71	4.57
	40 / 45 °C	CAP (Nom./Max.)	kW	7.5/10.0	11.0/14.1	14.0/15.7	16.0/17.3
		COP (Nom.)	-	3.50	3.80	3.61	3.40
	47 / 55 °C	CAP (Nom./Max.)	kW	7.5/9.2	11.0/13.5	14.0/15.2	16.0/17.0
		COP (Nom.)	-	2.70	3.00	2.80	2.50
2 / 1 °C	30 / 35 °C	CAP (Nom./Max.)	kW	5.5/8.9	9.5/12.8	10.5/13.9	11.1/15.0
		COP (Nom.)	-	3.53	3.70	3.55	3.41
-7 / -8 °C	30 / 35 °C	CAP (Nom./Max.)	kW	6.0/6.7	9.7/10.6	11.5/12.0	12.0/13.0
		COP (Nom.)	-	2.57	2.74	2.65	2.57
	40 / 45 °C	CAP (Nom./Max.)	kW	5.5/6.4	10.0/10.3	11.0/11.6	11.5/12.5
		COP (Nom.)	-	2.25	2.45	2.25	2.15
	47 / 55 °C	CAP (Nom./Max.)	kW	5.5/5.5	8.7/9.8	9.7/11.2	10.5/12.0
		COP (Nom.)	-	1.72	1.78	1.85	1.75

OAT (DB/WB)	WIT / WOT	-	Unit	Cooling operation (Using cooling kit accessory)			
35 / -- °C	12 / 7 °C	CAP (Nom/Max)	kW	6.0/7.0	7.2/11.8	9.5/12.6	10.5/13.7
		EER (Nom.)	-	2.75	3.54	3.54	3.31
	23 / 18 °C	CAP (Nom/Max)	kW	6.0/8.5	10.4/15.0	12.9/16.0	13.5/17.5
		EER (Nom.)	-	3.81	4.50	4.02	3.81

3.2 ERP performance data

3.2.1 General considerations

- This appliance must be installed, maintained and dismantled by professionals. Do not pour contained refrigerant into the atmosphere since this refrigerant fluid is a fluorinated greenhouse gas regulated under European Regulation (EU) Nº 517/2014.
- Data with the mark (*) in General ERP data corresponds to the “Energy efficiency contribution (η_S)” due to the use of temperature control.

OTC control (Factory-supplied)	
Temperature control class	II
Energy efficiency contribution	+2%

Wired room thermostat (PC-ARFHE-02) Wireless room thermostat (ATW-RTU-04) Wired room sensor (ATW-ITS-01)	
Temperature control class	VI
Contribution to the nominal energy efficiency	+4%

- **Data between brackets corresponds only to heating and cooling models (“Cooling kit” accessory needed).**

3.2.2 General ERP data for space heaters

3.2.2.1 ERP data - YUTAKI S

◆ **AVERAGE climate**

RAS-(2-3)WHVNP + RWM-(2.0-3.0)NE(-W)

Model			HP	2.0 HP		2.5 HP		3.0 HP	
			Outdoor unit	RAS-2WHVNP		RAS-2.5WHVNP		RAS-3WHVNP	
			Indoor unit	RWM-2.0NE(-W)		RWM-2.5NE(-W)		RWM-3.0NE(-W)	
Water outlet temperature				35ºC	55ºC	35ºC	55ºC	35ºC	55ºC
Product description	Air to water heat pump		-	Yes					
	Heat pump combination heater		-	No					
	Low temperature heat pump		-	No					
	Complementary heater		-	Yes					
Design capacity (P_{DESIGN})			kW	4.0	4.0	6.0	5.0	7.0	6.0
Nominal energy efficiency (η_S)			%	189 (194)	137 (140)	177 (180)	130 (132)	165 (167)	125 (127)
Nominal energy class			-	A+++	A++	A+++	A++	A++	A++
Data for Packaged Fiche:									
Energy efficiency with OTC control (η_S) (*)			%	191 (196)	139 (142)	179 (182)	132 (134)	167 (169)	127 (129)
Energy class with OTC control			-	A+++	A++	A+++	A++	A++	A++
Energy efficiency with thermostats/sensors (η_S) (*)			%	193 (198)	141 (144)	181 (184)	134 (136)	169 (171)	129 (131)
Energy class with thermostats			-	A+++	A++	A+++	A++	A++	A++
Supplementary capacity (P_{SUP})			kW	0.0	0.9	0.3	1.1	0.6	1.5
Type of energy used			-	Electricity					
Declared capacity (Pdh) and coefficient of performance (COP_d) at partial load under the following outdoor temperatures:									
Outdoor temperature (Tj) = -7ºC		Pdh	kW	3.54	3.50	4.95	4.42	5.90	5.10
		COP_d	-	3.20	2.30	2.70	1.85	2.50	1.84
Outdoor temperature (Tj) = +2ºC		Pdh	kW	2.15	2.10	3.01	2.69	3.59	3.10
		COP_d	-	5.20	3.73	4.60	3.45	4.40	3.20
Outdoor temperature (Tj) = +7ºC		Pdh	kW	1.70	1.60	1.90	1.84	2.31	2.00
		COP_d	-	6.05	4.40	6.00	4.20	5.35	4.45
Outdoor temperature (Tj) = +12ºC		Pdh	kW	1.75	1.60	1.80	2.06	2.10	2.30
		COP_d	-	6.25	5.00	7.20	6.90	6.15	5.96
Outdoor temperature (Tj) = Bivalent temperature (T_{biv})		Pdh	kW	3.54	3.50	4.95	4.42	5.90	5.10
		COP_d	-	3.20	2.30	2.70	1.85	2.50	1.84
Outdoor temperature (Tj) = Limit operation temperature (TOL)		Pdh	kW	4.00	3.10	5.30	3.90	6.40	4.30
		COP_d	-	2.75	1.90	2.50	1.80	2.30	1.65
Bivalent temperature (T_{biv})			ºC	-7	-7	-7	-7	-7	-7
Limit operation temperature (TOL)			ºC	-10	-10	-10	-15	-10	-15
Water limit operation temperature (WTOL)			ºC	55	55	55	55	55	55
Degradation coefficient (Cdh)			-	0.9	0.9	0.9	0.9	0.9	0.9
Annual energy consumption (Q_{HE})			kW·h	1719 (1675)	2358 (2314)	2569 (2525)	3114 (3070)	3286 (3242)	3724 (3690)

RAS-(4-6)WHVNPE + RWM-(4.0-6.0)NE(-W)

Model				4.0 HP		5.0 HP		6.0 HP	
			Outdoor unit	RAS-4WHVNPE		RAS-5WHVNPE		RAS-6WHVNPE	
			Indoor unit	RWM-4.0NE(-W)		RWM-5.0NE(-W)		RWM-6.0NE(-W)	
Water outlet temperature				35ºC	55ºC	35ºC	55ºC	35ºC	55ºC
Product description	Air to water heat pump		-	Yes					
	Heat pump combination heater		-	No					
	Low temperature heat pump		-	No					
	Complementary heater		-	Yes					
Design capacity (P_{DESIGN})			kW	11.0	10.0	14.0	12.0	16.0	14.0
Nominal energy efficiency (η_S)			%	187 (189)	136 (137)	175 (176)	133 (134)	153 (153)	125 (126)
Nominal energy class			-	A+++	A++	A+++	A++	A++	A++
Data for Packaged Fiche:									
	Energy efficiency with OTC control (η_S) (*)		%	189 (191)	138 (139)	177 (178)	135 (136)	155 (155)	127 (128)
	Energy class with OTC control		-	A+++	A++	A+++	A++	A++	A++
	Energy efficiency with thermostats/sensors (η_S) (*)		%	191 (193)	140 (141)	179 (180)	137 (138)	157 (157)	129 (130)
	Energy class with thermostats		-	A+++	A++	A+++	A++	A++	A++
Supplementary capacity (P_{SUP})			kW	0.5	2.3	1.9	2.6	1.9	3.1
Type of energy used			-	Electricity					
Declared capacity (Pdh) and coefficient of performance (COP_d) at partial load under the following outdoor temperatures:									
	Outdoor temperature (Tj) = -7ºC	Pdh	kW	9.60	8.60	12.00	10.25	13.80	11.20
		COP_d	-	2.74	1.80	2.55	1.70	2.40	1.60
	Outdoor temperature (Tj) = +2ºC	Pdh	kW	5.84	5.23	7.30	6.24	8.40	6.82
		COP_d	-	5.20	3.60	4.70	3.60	3.90	3.35
	Outdoor temperature (Tj) = +7ºC	Pdh	kW	3.76	3.52	4.70	4.01	5.40	4.38
		COP_d	-	5.80	4.80	5.70	4.60	5.00	4.35
	Outdoor temperature (Tj) = +12ºC	Pdh	kW	3.70	3.60	3.50	3.50	3.50	3.60
		COP_d	-	6.40	5.80	6.00	5.50	6.00	5.50
	Outdoor temperature (Tj) = Bivalent temperature (T_{biv})	Pdh	kW	9.60	8.60	12.00	10.25	13.80	11.20
		COP_d	-	2.74	1.80	2.55	1.70	2.40	1.60
	Outdoor temperature (Tj) = Limit operation temperature (TOL)	Pdh	kW	10.50	7.40	12.10	9.00	14.10	10.5
		COP_d	-	2.65	1.70	2.50	1.60	2.30	1.40
Bivalent temperature (T_{biv})			ºC	-7	-7	-7	-7	-7	-7
Limit operation temperature (TOL)			ºC	-10	-10	-10	-10	-10	-10
Water limit operation temperature (WTOL)			ºC	55	55	55	55	55	55
Degradation coefficient (Cdh)			-	0.9	0.9	0.9	0.9	0.9	0.9
Annual energy consumption (Q_{HE})			kW·h	4714 (4666)	5815 (5767)	6313 (6265)	7066 (7018)	8287 (8239)	8780 (8732)

RAS-(4-6)WHNPE + RWM-(4.0-6.0)NE(-W)

Model			HP	4.0 HP		5.0 HP		6.0 HP	
			Outdoor unit	RAS-4WHNPE		RAS-5WHNPE		RAS-6WHNPE	
			Indoor unit	RWM-4.0NE(-W)		RWM-5.0NE(-W)		RWM-6.0NE(-W)	
Water outlet temperature				35ºC	55ºC	35ºC	55ºC	35ºC	55ºC
Product description	Air to water heat pump		-	Yes					
	Heat pump combination heater		-	No					
	Low temperature heat pump		-	No					
	Complementary heater		-	Yes					
Design capacity (P_{DESIGN})			kW	11.0	10.0	14.0	12.0	16.0	14.0
Nominal energy efficiency (η_S)			%	186(189)	135(137)	174(176)	133(134)	152(153)	125(126)
Nominal energy class			-	A+++	A++	A++ (A+++)	A++	A++	A++
Data for Packaged Fiche:									
	Energy efficiency with OTC control (η_S) (*)		%	188(191)	137(139)	176(178)	135(136)	154(155)	127(128)
	Energy class with OTC control		-	A+++	A++	A+++	A++	A++	A++
	Energy efficiency with thermostats/sensors (η_S) (*)		%	190(193)	139(141)	178(180)	137(138)	156(157)	129(130)
	Energy class with thermostats		-	A+++	A++	A+++	A++	A++	A++
Supplementary capacity (P_{SUP})			kW	0.5	2.3	1.9	2.6	1.9	3.1
Type of energy used			-	Electricity					
Declared capacity (Pdh) and coefficient of performance (COP_d) at partial load under the following outdoor temperatures:									
	Outdoor temperature (Tj) = -7ºC	Pdh	kW	9.60	8.60	12.00	10.25	13.80	11.20
		COP_d	-	2.74	1.80	2.55	1.70	2.40	1.60
	Outdoor temperature (Tj) = +2ºC	Pdh	kW	5.84	5.23	7.30	6.24	8.40	6.82
		COP_d	-	5.20	3.60	4.70	3.60	3.90	3.35
	Outdoor temperature (Tj) = +7ºC	Pdh	kW	3.76	3.52	4.70	4.01	5.40	4.38
		COP_d	-	5.80	4.80	5.70	4.60	5.00	4.35
	Outdoor temperature (Tj) = +12ºC	Pdh	kW	3.70	3.60	3.50	3.50	3.50	3.60
		COP_d	-	6.40	5.80	6.00	5.50	6.00	5.50
	Outdoor temperature (Tj) = Bivalent temperature (T_{biv})	Pdh	kW	9.60	8.60	12.00	10.25	13.80	11.20
		COP_d	-	2.74	1.80	2.55	1.70	2.40	1.60
	Outdoor temperature (Tj) = Limit operation temperature (TOL)	Pdh	kW	10.50	7.40	12.10	9.00	14.10	10.50
		COP_d	-	2.65	1.70	2.50	1.60	2.30	1.40
Bivalent temperature (T_{biv})			ºC	-7	-7	-7	-7	-7	-7
Limit operation temperature (TOL)			ºC	-10	-10	-10	-10	-10	-10
Water limit operation temperature (WTOL)			ºC	55	55	55	55	55	55
Degradation coefficient (Cdh)			-	0.9	0.9	0.9	0.9	0.9	0.9
Annual energy consumption (Q_{HE})			kW·h	4736 (4666)	5837 (5767)	6335 (6265)	7088 (7018)	8309 (8239)	8802 (8732)

RAS-(8/10)WHNPE + RWM-(8.0/10.0)NE(-W)

Model			HP	8.0 HP		10.0 HP	
			Outdoor unit	RAS-8WHNPE		RAS-10WHNPE	
			Indoor unit	RWM-8.0NE(-W)		RWM-10.0NE(-W)	
Water outlet temperature				35ºC	55ºC	35ºC	55ºC
Product description	Air to water heat pump		-	Yes			
	Heat pump combination heater		-	No			
	Low temperature heat pump		-	No			
	Complementary heater		-	Yes			
Design capacity (P_{DESIGN})			kW	18.0	16.0	20.0	18.0
Nominal energy efficiency (η_S)			%	150 (152)	120 (122)	141 (142)	116 (118)
Nominal energy class			-	A++	A+	A+	A+
Data for Packaged Fiche:							
Energy efficiency with OTC control (η_S) (*)			%	152 (154)	122 (124)	143 (144)	118 (120)
Energy class with OTC control			-	A++	A+	A+	A+
Energy efficiency with thermostats/sensors (η_S) (*)			%	154 (156)	124(126)	145 (146)	120 (122)
Energy class with thermostats			-	A++	A+ (A++)	A+	A+
Supplementary capacity (P_{SUP})			kW	1.6	3.5	1.7	3.6
Type of energy used			-	Electricity			
Declared capacity (Pdh) and coefficient of performance (COP_d) at partial load under the following outdoor temperatures:							
Outdoor temperature (Tj) = -7ºC		Pdh	kW	15.60	13.80	17.40	15.60
		COP_d	-	2.50	1.65	2.30	1.65
Outdoor temperature (Tj) = +2ºC		Pdh	kW	9.50	8.40	10.77	9.50
		COP_d	-	3.85	3.20	3.60	3.10
Outdoor temperature (Tj) = +7ºC		Pdh	kW	6.10	6.00	8.70	8.30
		COP_d	-	5.40	4.50	5.10	4.35
Outdoor temperature (Tj) = +12ºC		Pdh	kW	7.00	6.80	8.70	8.50
		COP_d	-	4.65	4.50	4.90	4.60
Outdoor temperature (Tj) = Bivalent temperature (T_{biv})		Pdh	kW	15.60	13.80	17.40	15.60
		COP_d	-	2.50	1.65	2.10	1.65
Outdoor temperature (Tj) = Limit operation temperature (TOL)		Pdh	kW	16.00	12.10	18.00	14.00
		COP_d	-	2.40	1.50	2.30	1.45
Bivalent temperature (T_{biv})			ºC	-7	-7	-7	-7
Limit operation temperature (TOL)			ºC	-10	-10	-10	-10
Water limit operation temperature (WTOL)			ºC	55	55	55	55
Degradation coefficient (Cdh)			-	0.9	0.9	0.9	0.9
Annual energy consumption (Q_{HE})			kW·h	9513 (9382)	10452 (10320)	11410 (11278)	12210 (12078)

◆ WARMER climate

RAS-(2-3)WHVNP + RWM-(2.0-3.0)NE(-W)

Model	HP		2.0 HP	2.5 HP	3.0 HP
	Outdoor unit		RAS-2WHVNP	RAS-2.5WHVNP	RAS-3WHVNP
	Indoor unit		RWM-2.0NE(-W)	RWM-2.5NE(-W)	RWM-3.0NE(-W)
Design capacity (P_{DESIGN})		kW	4	5	6
(1) Nominal energy efficiency (η_S)		%	179	172	165
Data for Packaged Fiche:					
(2) Energy efficiency with OTC control (η_S) (*)		%	181	174	167
(3) Energy efficiency with thermostats (η_S) (*)		%	183	176	169
Annual energy consumption (Q_{HE})		kW·h	1174	1530	1904

RAS-(4-6)WH(V)NPE + RWM-(4.0-6.0)NE(-W)

Model	HP		4.0 HP	5.0 HP	6.0 HP
	Outdoor unit		RAS-4WHVNPE	RAS-5WHVNPE	RAS-6WHVNPE
	Indoor unit		RWM-4.0NE(-W)	RWM-5.0NE(-W)	RWM-6.0NE(-W)
Design capacity (P_{DESIGN})		kW	10	12	14
(1) Nominal energy efficiency (η_S)		%	193	183	177
Data for Packaged Fiche:					
(2) Energy efficiency with OTC control (η_S) (*)		%	195	185	179
(3) Energy efficiency with thermostats (η_S) (*)		%	197	187	181
Annual energy consumption (Q_{HE})		kW·h	2722	3454	4148

Model	HP		4.0 HP	5.0 HP	6.0 HP
	Outdoor unit		RAS-4WHNPE	RAS-5WHNPE	RAS-6WHNPE
	Indoor unit		RWM-4.0NE(-W)	RWM-5.0NE(-W)	RWM-6.0NE(-W)
Design capacity (P_{DESIGN})		kW	10	12	14
(1) Nominal energy efficiency (η_S)		%	191	181	176
Data for Packaged Fiche:					
(2) Energy efficiency with OTC control (η_S) (*)		%	193	183	178
(3) Energy efficiency with thermostats (η_S) (*)		%	195	185	180
Annual energy consumption (Q_{HE})		kW·h	2748	3481	4175

RAS-(8/10)WHNPE + RWM-(8.0/10.0)NE(-W)

Model	HP		8.0 HP	10.0 HP
	Outdoor unit		RAS-8WHNPE	RAS-10WHNPE
	Indoor unit		RWM-8.0NE(-W)	RWM-10.0NE(-W)
Design capacity (P_{DESIGN})		kW	16	18
(1) Nominal energy efficiency (η_S)		%	179	176
Data for Packaged Fiche:				
(2) Energy efficiency with OTC control (η_S) (*)		%	181	178
(3) Energy efficiency with thermostats (η_S) (*)		%	183	180
Annual energy consumption (Q_{HE})		kW·h	4702	5384

◆ COLDER climate

RAS-(2-3)WHVNP + RWM-(2.0-3.0)NE(-W)

Model	HP		2.0 HP	2.5 HP	3.0 HP
	Outdoor unit		RAS-2WHVNP	RAS-2.5WHVNP	RAS-3WHVNP
	Indoor unit		RWM-2.0NE(-W)	RWM-2.5NE(-W)	RWM-3.0NE(-W)
Design capacity (P_{DESIGN})		kW	4	5	6
(1) Nominal energy efficiency (η_S)		%	125	123	116
Data for Packaged Fiche:					
(2) Energy efficiency with OTC control (η_S) (*)		%	127	125	118
(3) Energy efficiency with thermostats (η_S) (*)		%	129	127	120
Annual energy consumption (Q_{HE})		kW·h	3017	4022	4980

RAS-(4-6)WH(V)NPE + RWM-(4.0-6.0)NE(-W)

Model	HP		4.0 HP	5.0 HP	6.0 HP
	Outdoor unit		RAS-4WHVNPE	RAS-5WHVNPE	RAS-6WHVNPE
	Indoor unit		RWM-4.0NE(-W)	RWM-5.0NE(-W)	RWM-6.0NE(-W)
Design capacity (P_{DESIGN})		kW	11	12	14
(1) Nominal energy efficiency (η_S)		%	120	119	112
Data for Packaged Fiche:					
(2) Energy efficiency with OTC control (η_S) (*)		%	122	121	114
(3) Energy efficiency with thermostats (η_S) (*)		%	124	123	116
Annual energy consumption (Q_{HE})		kW·h	8640	9514	11620

Model	HP		4.0 HP	5.0 HP	6.0 HP
	Outdoor unit		RAS-4WHNPE	RAS-5WHNPE	RAS-6WHNPE
	Indoor unit		RWM-4.0NE(-W)	RWM-5.0NE(-W)	RWM-6.0NE(-W)
Design capacity (P_{DESIGN})		kW	11	12	14
(1) Nominal energy efficiency (η_S)		%	120	119	112
Data for Packaged Fiche:					
(2) Energy efficiency with OTC control (η_S) (*)		%	122	121	114
(3) Energy efficiency with thermostats (η_S) (*)		%	124	123	116
Annual energy consumption (Q_{HE})		kW·h	8654	9528	11633

RAS-(8/10)WHNPE + RWM-(8.0/10.0)NE(-W)

Model	HP		8.0 HP	10.0 HP
	Outdoor unit		RAS-8WHNPE	RAS-10WHNPE
	Indoor unit		RWM-8.0NE(-W)	RWM-10.0NE(-W)
Design capacity (P_{DESIGN})		kW	16	18
(1) Nominal energy efficiency (η_S)		%	109	107
Data for Packaged Fiche:				
(2) Energy efficiency with OTC control (η_S) (*)		%	111	109
(3) Energy efficiency with thermostats (η_S) (*)		%	113	111
Annual energy consumption (Q_{HE})		kW·h	13974	15905

3.2.2.2 ERP data - YUTAKI S COMBI

◆ **AVERAGE climate**

RAS-(2-3)WHVNP + RWD-(2.0-3.0)NW(S)E-(200/260)S(-K)(-W)

Model				HP	2.0 HP		2.5 HP		3.0 HP	
				Outdoor unit	RAS-2WHVNP		RAS-2.5WHVNP		RAS-3WHVNP	
				Indoor unit	RWD-2.0NW(S)E-(200/260)S(-K)(-W)		RWD-2.5NW(S)E-(200/260)S(-K)(-W)		RWD-3.0NW(S)E-(200/260)S(-K)(-W)	
Water outlet temperature					35ºC	55ºC	35ºC	55ºC	35ºC	55ºC
Product description	Air to water heat pump			-	Yes					
	Heat pump combination heater			-	No					
	Low temperature heat pump			-	No					
	Complementary heater			-	Yes					
Design capacity (P_{DESIGN})				kW	4.0	4.0	6.0	5.0	7.0	6.0
Nominal energy efficiency (η_S)				%	189 (194)	137 (140)	177 (180)	130 (132)	165 (167)	125 (127)
Nominal energy class				-	A+++	A++	A+++	A++	A++	A++
Data for Packaged Fiche:										
	Energy efficiency with OTC control (η_S) (*)			%	191 (196)	139 (142)	179 (182)	132 (134)	167 (169)	127 (129)
	Energy class with OTC control			-	A+++	A++	A+++	A++	A++	A++
	Energy efficiency with thermostats/sensors (η_S) (*)			%	193 (198)	141 (144)	181 (184)	134 (136)	169 (171)	129 (131)
	Energy class with thermostats			-	A+++	A++	A+++	A++	A++	A++
Supplementary capacity (P_{SUP})				kW	0.0	0.9	0.3	1.1	0.6	1.5
Type of energy used				-	Electricity					
Declared capacity (Pdh) and coefficient of performance (COP_d) at partial load under the following outdoor temperatures:										
	Outdoor temperature (Tj) = -7ºC	Pdh		kW	3.54	3.50	4.95	4.42	5.90	5.10
		COP_d		-	3.20	2.30	2.70	1.85	2.50	1.84
	Outdoor temperature (Tj) = +2ºC	Pdh		kW	2.15	2.10	3.01	2.69	3.59	3.10
		COP_d		-	5.20	3.73	4.60	3.45	4.40	3.20
	Outdoor temperature (Tj) = +7ºC	Pdh		kW	1.70	1.60	1.90	1.84	2.31	2.00
		COP_d		-	6.05	4.40	6.00	4.20	5.35	4.45
	Outdoor temperature (Tj) = +12ºC	Pdh		kW	1.75	1.60	1.80	2.06	2.10	2.30
		COP_d		-	6.25	5.00	7.20	6.90	6.15	5.96
	Outdoor temperature (Tj) = Bivalent temperature (T_{biv})	Pdh		kW	3.54	3.50	4.95	4.42	5.90	5.10
		COP_d		-	3.20	2.30	2.70	1.85	2.50	1.84
	Outdoor temperature (Tj) = Limit operation temperature (TOL)	Pdh		kW	4.00	3.10	5.30	3.90	6.40	4.30
		COP_d		-	2.75	1.90	2.50	1.80	2.30	1.65
Bivalent temperature (T_{biv})				ºC	-7	-7	-7	-7	-7	-7
Limit operation temperature (TOL)				ºC	-10	-10	-10	-15	-10	-15
Water limit operation temperature (WTOL)				ºC	55	55	55	55	55	55
Degradation coefficient (Cdh)				-	0.9	0.9	0.9	0.9	0.9	0.9
Annual energy consumption (Q_{HE})				kW·h	1719 (1675)	2358 (2314)	2569 (2525)	3114 (3070)	3286 (3242)	3724 (3690)

RAS-(4-6)WHVNPE + RWD-(4.0-6.0)NW(S)E-(200/260)S(-K)(-W)

Model			HP	4.0 HP		5.0 HP		6.0 HP	
			Outdoor unit	RAS-4WHVNPE		RAS-5WHVNPE		RAS-6WHVNPE	
			Indoor unit	RWD-4.0NW(S)E-(200/260)S(-K)(-W)		RWD-5.0NW(S)E-(200/260)S(-K)(-W)		RWD-6.0NW(S)E-(200/260)S(-K)(-W)	
Water outlet temperature				35ºC	55ºC	35ºC	55ºC	35ºC	55ºC
Product description	Air to water heat pump		-	Yes					
	Heat pump combination heater		-	No					
	Low temperature heat pump		-	No					
	Complementary heater		-	Yes					
Design capacity (P_{DESIGN})			kW	11.0	10.0	14.0	12.0	16.0	14.0
Nominal energy efficiency (η_S)			%	187 (189)	136 (137)	175 (176)	133 (134)	153 (153)	125 (126)
Nominal energy class			-	A+++	A++	A+++	A++	A++	A++
Data for Packaged Fiche:									
	Energy efficiency with OTC control (η_S) (*)		%	189 (191)	138 (139)	177 (178)	135 (136)	155 (155)	127 (128)
	Energy class with OTC control		-	A+++	A++	A+++	A++	A++	A++
	Energy efficiency with thermostats/sensors (η_S) (*)		%	191 (193)	140 (141)	179 (180)	137 (138)	157 (157)	129 (130)
	Energy class with thermostats		-	A+++	A++	A+++	A++	A++	A++
Supplementary capacity (P_{SUP})			kW	0.5	2.3	1.9	2.6	1.9	3.1
Type of energy used			-	Electricity					
Declared capacity (Pdh) and coefficient of performance (COP_d) at partial load under the following outdoor temperatures:									
	Outdoor temperature (Tj) = -7ºC	Pdh	kW	9.60	8.60	12.00	10.25	13.80	11.20
		COP_d	-	2.74	1.80	2.55	1.70	2.40	1.60
	Outdoor temperature (Tj) = +2ºC	Pdh	kW	5.84	5.23	7.30	6.24	8.40	6.82
		COP_d	-	5.20	3.60	4.70	3.60	3.90	3.35
	Outdoor temperature (Tj) = +7ºC	Pdh	kW	3.76	3.52	4.70	4.01	5.40	4.38
		COP_d	-	5.80	4.80	5.70	4.60	5.00	4.35
	Outdoor temperature (Tj) = +12ºC	Pdh	kW	3.70	3.60	3.50	3.50	3.50	3.60
		COP_d	-	6.40	5.80	6.00	5.50	6.00	5.50
	Outdoor temperature (Tj) = Bivalent temperature (T_{biv})	Pdh	kW	9.60	8.60	12.00	10.25	13.80	11.20
		COP_d	-	2.74	1.80	2.55	1.70	2.40	1.60
	Outdoor temperature (Tj) = Limit operation temperature (TOL)	Pdh	kW	10.50	7.40	12.10	9.00	14.10	10.5
		COP_d	-	2.65	1.70	2.50	1.60	2.30	1.40
Bivalent temperature (T_{biv})			ºC	-7	-7	-7	-7	-7	-7
Limit operation temperature (TOL)			ºC	-10	-10	-10	-10	-10	-10
Water limit operation temperature (WTOL)			ºC	55	55	55	55	55	55
Degradation coefficient (Cdh)			-	0.9	0.9	0.9	0.9	0.9	0.9
Annual energy consumption (Q_{HE})			kW·h	4714 (4666)	5815 (5767)	6313 (6265)	7066 (7018)	8287 (8239)	8780 (8732)

RAS-(4-6)WHNPE + RWD-(4.0-6.0)NW(S)E-(200/260)S(-K)(-W)

Model			HP	4.0 HP		5.0 HP		6.0 HP	
			Outdoor unit	RAS-4WHNPE		RAS-5WHNPE		RAS-6WHNPE	
			Indoor unit	RWD-4.0NW(S)E-(200/260)S(-K)(-W)		RWD-5.0NW(S)E-(200/260)S(-K)(-W)		RWD-6.0NW(S)E-(200/260)S(-K)(-W)	
Water outlet temperature				35ºC	55ºC	35ºC	55ºC	35ºC	55ºC
Product description	Air to water heat pump		-	Yes					
	Heat pump combination heater		-	No					
	Low temperature heat pump		-	No					
	Complementary heater		-	Yes					
Design capacity (P_{DESIGN})			kW	11.0	10.0	14.0	12.0	16.0	14.0
Nominal energy efficiency (η_S)			%	186(189)	135(137)	174(176)	133(134)	152(153)	125(126)
Nominal energy class			-	A+++	A++	A++ (A+++)	A++	A++	A++
Data for Packaged Fiche:									
Energy efficiency with OTC control (η_S) (*)			%	188(191)	137(139)	176(178)	135(136)	154(155)	127(128)
Energy class with OTC control			-	A+++	A++	A+++	A++	A++	A++
Energy efficiency with thermostats/sensors (η_S) (*)			%	190(193)	139(141)	178(180)	137(138)	156(157)	129(130)
Energy class with thermostats			-	A+++	A++	A+++	A++	A++	A++
Supplementary capacity (P_{SUP})			kW	0.5	2.3	1.9	2.6	1.9	3.1
Type of energy used			-	Electricity					
Declared capacity (Pdh) and coefficient of performance (COP_d) at partial load under the following outdoor temperatures:									
Outdoor temperature (Tj) = -7ºC		Pdh	kW	9.60	8.60	12.00	10.25	13.80	11.20
		COP_d	-	2.74	1.80	2.55	1.70	2.40	1.60
Outdoor temperature (Tj) = +2ºC		Pdh	kW	5.84	5.23	7.30	6.24	8.40	6.82
		COP_d	-	5.20	3.60	4.70	3.60	3.90	3.35
Outdoor temperature (Tj) = +7ºC		Pdh	kW	3.76	3.52	4.70	4.01	5.40	4.38
		COP_d	-	5.80	4.80	5.70	4.60	5.00	4.35
Outdoor temperature (Tj) = +12ºC		Pdh	kW	3.70	3.60	3.50	3.50	3.50	3.60
		COP_d	-	6.40	5.80	6.00	5.50	6.00	5.50
Outdoor temperature (Tj) = Bivalent temperature (T_{biv})		Pdh	kW	9.60	8.60	12.00	10.25	13.80	11.20
		COP_d	-	2.74	1.80	2.55	1.70	2.40	1.60
Outdoor temperature (Tj) = Limit operation temperature (TOL)		Pdh	kW	10.50	7.40	12.10	9.00	14.10	10.50
		COP_d	-	2.65	1.70	2.50	1.60	2.30	1.40
Bivalent temperature (T_{biv})			ºC	-7	-7	-7	-7	-7	-7
Limit operation temperature (TOL)			ºC	-10	-10	-10	-10	-10	-10
Water limit operation temperature (WTOL)			ºC	55	55	55	55	55	55
Degradation coefficient (Cdh)			-	0.9	0.9	0.9	0.9	0.9	0.9
Annual energy consumption (Q_{HE})			kW·h	4736 (4666)	5837 (5767)	6335 (6265)	7088 (7018)	8309 (8239)	8802 (8732)

◆ WARMER climate

RAS-(2-3)WHVNP + RWD-(2.0-3.0)NW(S)E-(200/260)S(-K)(-W)

Model	HP	2.0 HP	2.5 HP	3.0 HP
	Outdoor unit	RAS-2WHVNP	RAS-2.5WHVNP	RAS-3WHVNP
	Indoor unit	RWD-2.0NW(S)E-(200/260)S(-K)(-W)	RWD-2.5NW(S)E-(200/260)S(-K)(-W)	RWD-3.0NW(S)E-(200/260)S(-K)(-W)
Design capacity (P_{DESIGN})	kW	4	5	6
(1) Nominal energy efficiency (η_S)	%	179	172	165
Data for Packaged Fiche:				
(2) Energy efficiency with OTC control (η_S) (*)	%	181	175	167
(3) Energy efficiency with thermostats (η_S) (*)	%	183	177	169
Annual energy consumption (Q_{HE})	kW·h	1174	1530	1904

RAS-(4-6)WH(V)NPE + RWD-(4.0-6.0)NW(S)E-(200/260)S(-K)(-W)

Model	HP	4.0 HP	5.0 HP	6.0 HP
	Outdoor unit	RAS-4WHVNPE	RAS-5WHVNPE	RAS-6WHVNPE
	Indoor unit	RWD-4.0NW(S)E-(200/260)S(-K)(-W)	RWD-5.0NW(S)E-(200/260)S(-K)(-W)	RWD-6.0NW(S)E-(200/260)S(-K)(-W)
Design capacity (P_{DESIGN})	kW	10	12	14
(1) Nominal energy efficiency (η_S)	%	193	183	177
Data for Packaged Fiche:				
(2) Energy efficiency with OTC control (η_S) (*)	%	195	185	179
(3) Energy efficiency with thermostats (η_S) (*)	%	197	187	181
Annual energy consumption (Q_{HE})	kW·h	2722	3454	4148

Model	HP	4.0 HP	5.0 HP	6.0 HP
	Outdoor unit	RAS-4WHNPE	RAS-5WHNPE	RAS-6WHNPE
	Indoor unit	RWD-4.0NW(S)E-(200/260)S(-K)(-W)	RWD-5.0NW(S)E-(200/260)S(-K)(-W)	RWD-6.0NW(S)E-(200/260)S(-K)(-W)
Design capacity (P_{DESIGN})	kW	10	12	14
(1) Nominal energy efficiency (η_S)	%	191	181	176
Data for Packaged Fiche:				
(2) Energy efficiency with OTC control (η_S) (*)	%	193	183	178
(3) Energy efficiency with thermostats (η_S) (*)	%	195	185	180
Annual energy consumption (Q_{HE})	kW·h	2748	3481	4175

◆ COLDER climate

RAS-(2-3)WHVNP + RWD-(2.0-3.0)NW(S)E-(200/260)S(-K)(-W)

Model		HP	2.0 HP	2.5 HP	3.0 HP
		Outdoor unit	RAS-2WHVNP	RAS-2.5WHVNP	RAS-3WHVNP
		Indoor unit	RWD-2.0NW(S)E-(200/260)S(-K)(-W)	RWD-2.5NW(S)E-(200/260)S(-K)(-W)	RWD-3.0NW(S)E-(200/260)S(-K)(-W)
Design capacity (P_{DESIGN})		kW	4	5	6
(1) Nominal energy efficiency (η_S)		%	125	123	116
Data for Packaged Fiche:					
	(2) Energy efficiency with OTC control (η_S) (*)	%	127	125	118
	(3) Energy efficiency with thermostats (η_S) (*)	%	129	127	120
Annual energy consumption (Q_{HE})		kW·h	3017	4022	4980

RAS-(4-6)WH(V)NPE + RWD-(4.0-6.0)NW(S)E-(200/260)S(-K)(-W)

Model		HP	4.0 HP	5.0 HP	6.0 HP
		Outdoor unit	RAS-4WHVNPE	RAS-5WHVNPE	RAS-6WHVNPE
		Indoor unit	RWD-4.0NW(S)E-(200/260)S(-K)(-W)	RWD-5.0NW(S)E-(200/260)S(-K)(-W)	RWD-6.0NW(S)E-(200/260)S(-K)(-W)
Design capacity (P_{DESIGN})		kW	11	12	14
(1) Nominal energy efficiency (η_S)		%	120	119	112
Data for Packaged Fiche:					
	(2) Energy efficiency with OTC control (η_S) (*)	%	122	121	114
	(3) Energy efficiency with thermostats (η_S) (*)	%	124	123	116
Annual energy consumption (Q_{HE})		kW·h	8640	9514	11620

Model		HP	4.0 HP	5.0 HP	6.0 HP
		Outdoor unit	RAS-4WHNPE	RAS-5WHNPE	RAS-6WHNPE
		Indoor unit	RWD-4.0NW(S)E-(200/260)S(-K)(-W)	RWD-5.0NW(S)E-(200/260)S(-K)(-W)	RWD-6.0NW(S)E-(200/260)S(-K)(-W)
Design capacity (P_{DESIGN})		kW	11	12	14
(1) Nominal energy efficiency (η_S)		%	120	119	112
Data for Packaged Fiche:					
	(2) Energy efficiency with OTC control (η_S) (*)	%	122	121	114
	(3) Energy efficiency with thermostats (η_S) (*)	%	124	123	116
Annual energy consumption (Q_{HE})		kW·h	8654	9528	11633

3.2.2.3 ERP data - YUTAKI S80

◆ AVERAGE climate

RAS-(4-6)WHVNPE + RWH-(4.0-6.0)VNF(W)E

Model			HP	4.0 HP		5.0 HP		6.0 HP	
			Outdoor unit	RAS-4WHVNPE		RAS-5WHVNPE		RAS-6WHVNPE	
			Indoor unit	RWH-4.0VNF(W)E		RWH-5.0VNF(W)E		RWH-6.0VNF(W)E	
Water outlet temperature				35ºC	55ºC	35ºC	55ºC	35ºC	55ºC
Product description	Air to water heat pump		-	Yes					
	Heat pump combination heater		-	No					
	Low temperature heat pump		-	No					
	Complementary heater		-	No					
Design capacity (P_{DESIGN})			kW	11.0	11.0	14.0	14.0	16.0	16.0
Nominal energy efficiency (η_S)			%	187	142	174	131	152	126
Nominal energy class			-	A+++	A++	A++	A++	A++	A++
Data for Packaged Fiche:									
Energy efficiency with OTC control (η_S) (*)			%	189	144	176	133	154	128
Energy class with OTC control			-	A+++	A++	A+++	A++	A++	A++
Energy efficiency with thermostats (η_S) (*)			%	191	146	178	135	156	130
Energy class with thermostats			-	A+++	A++	A+++	A++	A++	A++
Supplementary capacity (P_{SUP})			kW	0.5	0.0	1.9	0.0	1.9	0.0
Type of energy used			-	Electricity					
Declared capacity (Pdh) and coefficient of performance (COP_d) at partial load under the following outdoor temperatures:									
Outdoor temperature (Tj) = -7ºC		Pdh	kW	9.60	9.73	12.00	12.38	13.80	14.15
		COP_d	-	2.74	2.30	2.55	2.19	2.40	2.05
Outdoor temperature (Tj) = +2ºC		Pdh	kW	5.84	5.92	7.30	7.54	8.40	8.62
		COP_d	-	5.20	3.60	4.70	3.10	3.90	2.95
Outdoor temperature (Tj) = +7ºC		Pdh	kW	3.76	3.81	4.70	4.85	5.40	5.54
		COP_d	-	5.80	4.70	5.70	4.60	5.00	4.60
Outdoor temperature (Tj) = +12ºC		Pdh	kW	3.70	3.60	3.50	4.10	3.50	4.10
		COP_d	-	6.40	6.00	6.00	6.40	6.00	6.40
Outdoor temperature (Tj) = Bivalent temperature (T_{biv})		Pdh	kW	9.60	11.00	12.00	14.00	13.80	16.00
		COP_d	-	2.74	2.20	2.55	2.12	2.40	1.90
Outdoor temperature (Tj) = Limit operation temperature (TOL)		Pdh	kW	10.50	11.00	12.10	14.00	14.10	16.00
		COP_d	-	2.65	2.20	2.50	2.12	2.30	1.90
Bivalent temperature (T_{biv})			ºC	-7	-10	-7	-10	-7	-10
Limit operation temperature (TOL)			ºC	-10	-10	-10	-10	-10	-10
Water limit operation temperature (WTOL)			ºC	55	55	55	55	55	55
Degradation coefficient (Cdh)			-	0.9	0.9	0.9	0.9	0.9	0.9
Annual energy consumption (Q_{HE})			kW·h	4732	6261	6330	8648	8304	10255

RAS-(4-6)WHNPE + RWH-(4.0-6.0)NF(W)E

Model			HP	4.0 HP		5.0 HP		6.0 HP	
			Outdoor unit	RAS-4WHNPE		RAS-5WHNPE		RAS-6WHNPE	
			Indoor unit	RWH-4.0NF(W)E		RWH-5.0NF(W)E		RWH-6.0NF(W)E	
Water outlet temperature				35ºC	55ºC	35ºC	55ºC	35ºC	55ºC
Product description	Air to water heat pump		-	Yes					
	Heat pump combination heater		-	No					
	Low temperature heat pump		-	No					
	Complementary heater		-	No					
Design capacity (P_{DESIGN})			kW	11.0	11.0	14.0	14.0	16.0	16.0
Nominal energy efficiency (η_S)			%	183	140	171	129	150	125
Nominal energy class			-	A+++	A++	A++	A++	A++	A++
Data for Packaged Fiche:									
Energy efficiency with OTC control (η_S) (*)			%	185	142	173	131	152	127
Energy class with OTC control			-	A+++	A++	A++	A++	A++	A++
Energy efficiency with thermostats (η_S) (*)			%	187	144	176	134	154	129
Energy class with thermostats			-	A+++	A++	A+++	A++	A++	A++
Supplementary capacity (P_{SUP})			kW	0.5	0.0	1.5	0.0	1.5	0.0
Type of energy used			-	Electricity					
Declared capacity (Pdh) and coefficient of performance (COP_d) at partial load under the following outdoor temperatures:									
Outdoor temperature (Tj) = -7ºC		Pdh	kW	9.60	9.73	12.00	12.38	13.80	14.15
		COP_d	-	2.74	2.30	2.55	2.19	2.40	2.05
Outdoor temperature (Tj) = +2ºC		Pdh	kW	5.84	5.92	7.30	7.54	8.40	8.62
		COP_d	-	5.20	3.60	4.70	3.10	3.90	2.95
Outdoor temperature (Tj) = +7ºC		Pdh	kW	3.76	3.81	4.70	4.85	5.40	5.54
		COP_d	-	5.80	4.70	5.70	4.60	5.00	4.60
Outdoor temperature (Tj) = +12ºC		Pdh	kW	3.70	3.60	3.50	4.10	3.50	4.10
		COP_d	-	6.40	6.00	6.00	6.40	6.00	6.40
Outdoor temperature (Tj) = Bivalent temperature (T_{biv})		Pdh	kW	9.60	11.00	12.00	14.00	13.80	16.00
		COP_d	-	2.74	2.20	2.55	2.12	2.40	1.90
Outdoor temperature (Tj) = Limit operation temperature (TOL)		Pdh	kW	10.50	11.00	12.10	14.00	14.10	16.00
		COP_d	-	2.65	2.20	2.50	2.12	2.30	1.90
Bivalent temperature (T_{biv})			ºC	-7	-10	-7	-10	-7	-10
Limit operation temperature (TOL)			ºC	-10	-10	-10	-10	-10	-10
Water limit operation temperature (WTOL)			ºC	55	55	55	55	55	55
Degradation coefficient (Cdh)			-	0.9	0.9	0.9	0.9	0.9	0.9
Annual energy consumption (Q_{HE})			kW·h	4828	6360	6426	8747	8401	10335

◆ WARMER climate

RAS-(4-6)WH(V)NPE + RWH-(4.0-6.0)(V)NF(W)E + DHWS(200/260)S-2.0H2E(-W)

Model		HP	4.0 HP	5.0 HP	6.0 HP
		Outdoor unit	RAS-4WHVNPE	RAS-5WHVNPE	RAS-6WHVNPE
		Indoor unit	RWH-4.0VNF(W)E	RWH-5.0VNF(W)E	RWH-6.0VNF(W)E
		Tank unit (RWH-(V)NFWE)	DHWS(200/260) S-2.0H2E(-W)	DHWS(200/260) S-2.0H2E(-W)	DHWS(200/260) S-2.0H2E(-W)
Design capacity (P_{DESIGN})		kW	11	14	16
(1) Nominal energy efficiency (η_S)		%	188	177	173
Data for Packaged Fiche:					
	(2) Energy efficiency with OTC control (η_S) (*)	%	190	179	175
	(3) Energy efficiency with thermostats (η_S) (*)	%	192	181	177
Annual energy consumption (Q_{HE})		kW·h	3070	4156	4866

Model		HP	4.0 HP	5.0 HP	6.0 HP
		Outdoor unit	RAS-4WHNPE	RAS-5WHNPE	RAS-6WHNPE
		Indoor unit	RWH-4.0NF(W)E	RWH-5.0NF(W)E	RWH-6.0NF(W)E
		Tank unit (RWH-(V)NFWE)	DHWS(200/260) S-2.0H2E(-W)	DHWS(200/260) S-2.0H2E(-W)	DHWS(200/260) S-2.0H2E(-W)
Design capacity (P_{DESIGN})		kW	11	14	16
(1) Nominal energy efficiency (η_S)		%	181	172	168
Data for Packaged Fiche:					
	(2) Energy efficiency with OTC control (η_S) (*)	%	183	174	170
	(3) Energy efficiency with thermostats (η_S) (*)	%	185	176	172
Annual energy consumption (Q_{HE})		kW·h	3190	4276	4986

◆ COLDER climate

RAS-(4-6)WH(V)NPE + RWH-(4.0-6.0)(V)NF(W)E + DHWS(200/260)S-2.0H2E(-W)

Model		HP	4.0 HP	5.0 HP	6.0 HP
		Outdoor unit	RAS-4WHVNPE	RAS-5WHVNPE	RAS-6WHVNPE
		Indoor unit	RWH-4.0VNF(W)E	RWH-5.0VNF(W)E	RWH-6.0VNF(W)E
		Tank unit (RWH-(V)NFWE)	DHWS(200/260) S-2.0H2E(-W)	DHWS(200/260) S-2.0H2E(-W)	DHWS(200/260) S-2.0H2E(-W)
Design capacity (P_{DESIGN})		kW	13	17	18
(1) Nominal energy efficiency (η_S)		%	126	122	119
Data for Packaged Fiche:					
	(2) Energy efficiency with OTC control (η_S) (*)	%	128	124	121
	(3) Energy efficiency with thermostats (η_S) (*)	%	130	126	123
Annual energy consumption (Q_{HE})		kW·h	10292	13558	14860

Model		HP	4.0 HP	5.0 HP	6.0 HP
		Outdoor unit	RAS-4WHNPE	RAS-5WHNPE	RAS-6WHNPE
		Indoor unit	RWH-4.0NF(W)E	RWH-5.0NF(W)E	RWH-6.0NF(W)E
		Tank unit (RWH-(V)NFWE)	DHWS(200/260) S-2.0H2E(-W)	DHWS(200/260) S-2.0H2E(-W)	DHWS(200/260) S-2.0H2E(-W)
Design capacity (P_{DESIGN})		kW	13	17	18
(1) Nominal energy efficiency (η_S)		%	125	121	119
Data for Packaged Fiche:					
	(2) Energy efficiency with OTC control (η_S) (*)	%	127	123	121
	(3) Energy efficiency with thermostats (η_S) (*)	%	129	125	123
Annual energy consumption (Q_{HE})		kW·h	10352	13619	14920

◆ MCS Compliance points

RAS-(4-6)WHVNPE + RWH-(4.0-6.0)VNF(W)E

Model			HP	4.0 HP	5.0 HP	6.0 HP
			Outdoor unit	RAS-4WHVNPE	RAS-5WHVNPE	RAS-6WHVNPE
			Indoor unit	RWH-4.0VNF(W)E	RWH-5.0VNF(W)E	RWH-6.0VNF(W)E
Water outlet temperature				65ºC	65ºC	65ºC
Product description	Air to water heat pump		-	Yes		
	Heat pump combination heater		-	No		
	Low temperature heat pump		-	No		
	Complementary heater		-	No		
Design capacity (P_{DESIGN})			kW	11	14	15,3
Nominal energy efficiency (η_S)			%	120	118	118
Data for Packaged Fiche:						
Energy efficiency with OTC control (η_S) (*)			%	122	120	120
Energy efficiency with thermostats (η_S) (*)			%	124	122	122
Supplementary capacity (P_{SUP})			kW	0	0	0
Type of energy used			-	Electricity		
Declared capacity (Pdh) and coefficient of performance (COP_d) at partial load under the following outdoor temperatures:						
Outdoor temperature (Tj) = -7ºC		Pdh	kW	9,7	12,38	13,53
		COP_d	-	2,15	2,12	2,1
Outdoor temperature (Tj) = +2ºC		Pdh	kW	5,9	7,54	8,24
		COP_d	-	2,85	2,76	2,73
Outdoor temperature (Tj) = +7ºC		Pdh	kW	3,8	4,85	5,6
		COP_d	-	4	4	4,15
Outdoor temperature (Tj) = +12ºC		Pdh	kW	4,1	4,1	4,1
		COP_d	-	5,9	5,9	5,9
Outdoor temperature (Tj) = Bivalent temperature (T_{biv})		Pdh	kW	11	14	15,3
		COP_d	-	2,05	1,95	1,7
Outdoor temperature (Tj) = Limit operation temperature (TOL)		Pdh	kW	11	14	15,3
		COP_d	-	2,05	1,95	1,7
Bivalent temperature (T_{biv})			ºC	-10	-10	-10
Limit operation temperature (TOL)			ºC	-10	-10	-10
Water limit operation temperature (WTOL)			ºC	65	65	65
Degradation coefficient (Cdh)			-	0,9	0,9	0,9
Annual energy consumption (Q_{HE})			kW·h	7420	9583	10470

RAS-(4-6)WHNPE + RWH-(4.0-6.0)NF(W)E

Model			HP	4.0 HP	5.0 HP	6.0 HP
			Outdoor unit	RAS-4WHNPE	RAS-5WHNPE	RAS-6WHNPE
			Indoor unit	RWH-4.0NF(W)E	RWH-5.0NF(W)E	RWH-6.0NF(W)E
Water outlet temperature				65ºC	65ºC	65ºC
Product description	Air to water heat pump		-	Yes		
	Heat pump combination heater		-	No		
	Low temperature heat pump		-	No		
	Complementary heater		-	No		
Design capacity (P_{DESIGN})			kW	11	14	15,3
Nominal energy efficiency (η_S)			%	118	116	117
Data for Packaged Fiche:						
Energy efficiency with OTC control (η_S) (*)			%	120	118	119
Energy efficiency with thermostats (η_S) (*)			%	122	120	121
Supplementary capacity (P_{SUP})			kW	0	0	0
Type of energy used			-	Electricity		
Declared capacity (Pdh) and coefficient of performance (COP_d) at partial load under the following outdoor temperatures:						
Outdoor temperature (Tj) = -7ºC		Pdh	kW	9,7	12,38	13,53
		COP_d	-	2,15	2,12	2,1
Outdoor temperature (Tj) = +2ºC		Pdh	kW	5,9	7,54	8,24
		COP_d	-	2,85	2,76	2,73
Outdoor temperature (Tj) = +7ºC		Pdh	kW	3,8	4,85	5,6
		COP_d	-	4	4	4,15
Outdoor temperature (Tj) = +12ºC		Pdh	kW	4,1	4,1	4,1
		COP_d	-	5,9	5,9	5,9
Outdoor temperature (Tj) = Bivalent temperature (T_{biv})		Pdh	kW	11	14	15,3
		COP_d	-	2,05	1,95	1,7
Outdoor temperature (Tj) = Limit operation temperature (TOL)		Pdh	kW	11	14	15,3
		COP_d	-	2,05	1,95	1,7
Bivalent temperature (T_{biv})			ºC	-10	-10	-10
Limit operation temperature (TOL)			ºC	-10	-10	-10
Water limit operation temperature (WTOL)			ºC	65	65	65
Degradation coefficient (Cdh)			-	0,9	0,9	0,9
Annual energy consumption (Q_{HE})			kW·h	7520	9683	10569

3.2.2.4 ERP data - YUTAKI M

◆ AVERAGE climate

RASM-(3-6)VNE

HP				3.0 HP		4.0 HP		5.0 HP		6.0 HP	
Model				RASM-3VNE		RASM-4VNE		RASM-5VNE		RASM-6VNE	
Water outlet temperature				35ºC	55ºC	35ºC	55ºC	35ºC	55ºC	35ºC	55ºC
Product description	Air to water heat pump		-	Yes							
	Heat pump combination heater		-	No							
	Low temperature heat pump		-	No							
	Complementary heater		-	No							
Design capacity (P_{DESIGN})			kW	7.0	6.0	11.0	10.0	14.0	12.0	16.0	14.0
Nominal energy efficiency (η_S)			%	164 (167)	125 (127)	187 (189)	136 (137)	175 (176)	133 (134)	153 (153)	125 (126)
Nominal energy class			-	A++	A++	A+++	A++	A+++	A++	A++	A++
Data for Packaged Fiche:											
Energy efficiency with OTC control (η_S) (*)			%	166 (169)	127 (129)	189 (191)	138 (139)	177 (178)	135 (136)	155 (155)	127 (128)
Energy class with OTC control			-	A++	A++	A+++	A++	A+++	A++	A++	A++
Energy efficiency with thermostats (η_S) (*)			%	168 (171)	129 (131)	191 (193)	140 (141)	179 (180)	137 (138)	157 (157)	129 (130)
Energy class with thermostats			-	A++	A++	A+++	A++	A+++	A++	A++	A++
Supplementary capacity (P_{SUP})			kW	0.6	0.6	0.5	1.2	1.9	1.5	1.9	2.3
Type of energy used			-	Electricity							
Declared capacity (Pdh) and coefficient of performance (COP_d) at partial load under the following outdoor temperatures:											
Outdoor temperature (Tj) = -7ºC		Pdh	kW	5.90	5.10	9.60	8.60	12.00	10.25	13.80	11.20
		COP_d	-	2.50	1.84	2.74	1.80	2.55	1.70	2.40	1.60
Outdoor temperature (Tj) = +2ºC		Pdh	kW	3.59	3.10	5.84	5.23	7.30	6.24	8.40	6.82
		COP_d	-	4.40	3.20	5.20	3.60	4.70	3.60	3.90	3.35
Outdoor temperature (Tj) = +7ºC		Pdh	kW	2.31	2.00	3.76	3.52	4.70	4.01	5.40	4.38
		COP_d	-	5.35	4.45	5.80	4.80	5.70	4.60	5.00	4.35
Outdoor temperature (Tj) = +12ºC		Pdh	kW	2.10	2.30	3.70	3.60	3.50	3.50	3.50	3.60
		COP_d	-	6.15	5.96	6.40	5.80	6.00	5.50	6.00	5.50
Outdoor temperature (Tj) = Bivalent temperature (T_{biv})		Pdh	kW	5.90	5.10	9.60	8.60	12.00	10.25	13.80	11.20
		COP_d	-	2.50	1.84	2.74	1.80	2.55	1.70	2.40	1.60
Outdoor temperature (Tj) = Limit operation temperature (T_{OL})		Pdh	kW	6.40	5.20	10.50	8.80	12.10	10.50	14.10	11.70
		COP_d	-	2.30	1.65	2.65	1.90	2.50	1.70	2.30	1.55
Bivalent temperature (T_{biv})			ºC	-7	-7	-7	-7	-7	-7	-7	-7
Limit operation temperature (TOL)			ºC	-10	-15	-10	-10	-10	-10	-10	-10
Water limit operation temperature (WTOL)			ºC	55	55	55	55	55	55	55	55
Degradation coefficient (Cdh)			-	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Annual energy consumption (Q_{HE})			kW·h	3298 (3242)	3726 (3671)	4714 (4666)	5786 (5738)	6313 (6265)	7042 (6994)	8287 (8239)	8170 (8122)

RASM-(4-6)NE

HP				4.0 HP		5.0 HP		6.0 HP	
Model				RASM-4NE		RASM-5NE		RASM-6NE	
Water outlet temperature				35ºC	55ºC	35ºC	55ºC	35ºC	55ºC
Product description	Air to water heat pump		-	Yes					
	Heat pump combination heater		-	No					
	Low temperature heat pump		-	No					
	Complementary heater		-	No					
Design capacity (P_{DESIGN})			kW	11.0	10.0	14.0	12.0	16.0	14.0
Nominal energy efficiency (η_S)			%	186(189)	135(137)	174(176)	133(134)	152(153)	125(126)
Nominal energy class			-	A+++	A++	A++ (A+++)	A++	A++	A++
Data for Packaged Fiche:									
Energy efficiency with OTC control (η_S) (*)			%	188(191)	137(139)	176(178)	135(136)	154(155)	127(128)
Energy class with OTC control			-	A+++	A++	A+++	A++	A++	A++
Energy efficiency with thermostats (η_S) (*)			%	190(193)	139(141)	178(180)	137(138)	156(157)	129(130)
Energy class with thermostats			-	A+++	A++	A+++	A++	A++	A++
Supplementary capacity (P_{SUP})			kW	0.5	1.2	1.9	1.5	1.9	2.3
Type of energy used			-	Electricity					
Declared capacity (Pdh) and coefficient of performance (COP_d) at partial load under the following outdoor temperatures:									
Outdoor temperature (Tj) = -7ºC		Pdh	kW	9.60	8.60	12.00	10.25	13.80	11.20
		COP_d	-	2.74	1.80	2.55	1.70	2.40	1.60
Outdoor temperature (Tj) = +2ºC		Pdh	kW	5.84	5.23	7.30	6.24	8.40	6.82
		COP_d	-	5.20	3.60	4.70	3.60	3.90	3.35
Outdoor temperature (Tj) = +7ºC		Pdh	kW	3.76	3.52	4.70	4.01	5.40	4.38
		COP_d	-	5.80	4.80	5.70	4.60	5.00	4.35
Outdoor temperature (Tj) = +12ºC		Pdh	kW	3.70	3.60	3.50	3.50	3.50	3.60
		COP_d	-	6.40	5.80	6.00	5.50	6.00	5.50
Outdoor temperature (Tj) = Bivalent temperature (T_{biv})		Pdh	kW	9.60	8.60	12.00	10.25	13.80	11.20
		COP_d	-	2.74	1.80	2.55	1.70	2.40	1.60
Outdoor temperature (Tj) = Limit operation temperature (T_{ol})		Pdh	kW	10.50	8.80	12.10	10.50	14.10	11.70
		COP_d	-	2.65	1.90	2.50	1.70	2.30	1.55
Bivalent temperature (T_{biv})			ºC	-7	-7	-7	-7	-7	-7
Limit operation temperature (TOL)			ºC	-10	-10	-10	-10	-10	-10
Water limit operation temperature (WTOL)			ºC	55	55	55	55	55	55
Degradation coefficient (Cdh)			-	0.9	0.9	0.9	0.9	0.9	0.9
Annual energy consumption (Q_{HE})			kW·h	4736 (4666)	5808 (5738)	6335 (6265)	7064 (6994)	8309 (8239)	8192 (8122)

◆ WARMER climate

RASM-(3-6)(V)NE

Model		HP	3.0 HP	4.0 HP	5.0 HP	6.0 HP
		Outdoor unit	RASM-3VNE	RASM-4VNE	RASM-5VNE	RASM-6VNE
Design capacity (P_{DESIGN})		kW	6	10	12	14
(1) Nominal energy efficiency (η_S)		%	164	193	183	177
Data for Packaged Fiche:						
	(2) Energy efficiency with OTC control (η_S) (*)	%	166	195	185	179
	(3) Energy efficiency with thermostats (η_S) (*)	%	168	197	187	181
Annual energy consumption (Q_{HE})		kW·h	1919	2722	3454	4148

Model		HP	4.0 HP	5.0 HP	6.0 HP
		Outdoor unit	RASM-4NE	RASM-5NE	RASM-6NE
Design capacity (P_{DESIGN})		kW	10	12	14
(1) Nominal energy efficiency (η_S)		%	191	181	176
Data for Packaged Fiche:					
	(2) Energy efficiency with OTC control (η_S) (*)	%	193	183	178
	(3) Energy efficiency with thermostats (η_S) (*)	%	195	185	180
Annual energy consumption (Q_{HE})		kW·h	2748	3481	4175

◆ COLDER climate

RASM-(3-6)(V)NE

Model		HP	3.0 HP	4.0 HP	5.0 HP	6.0 HP
		Outdoor unit	RASM-3VNE	RASM-4VNE	RASM-5VNE	RASM-6VNE
Design capacity (P_{DESIGN})		kW	6	11	12	14
(1) Nominal energy efficiency (η_S)		%	116	120	119	112
Data for Packaged Fiche:						
	(2) Energy efficiency with OTC control (η_S) (*)	%	118	122	121	114
	(3) Energy efficiency with thermostats (η_S) (*)	%	120	124	123	116
Annual energy consumption (Q_{HE})		kW·h	4987	8640	9514	11620

Model		HP	4.0 HP	5.0 HP	6.0 HP
		Outdoor unit	RASM-4NE	RASM-5NE	RASM-6NE
Design capacity (P_{DESIGN})		kW	11	12	14
(1) Nominal energy efficiency (η_S)		%	120	119	112
Data for Packaged Fiche:					
	(2) Energy efficiency with OTC control (η_S) (*)	%	122	121	114
	(3) Energy efficiency with thermostats (η_S) (*)	%	124	123	116
Annual energy consumption (Q_{HE})		kW·h	8654	9528	11633

3.2.2.5 ERP additional data - YUTAKI S

RAS-(2-3)WHVNP + RWM-(2.0-3.0)NE(-W)

Model		HP	2.0 HP	2.5 HP	3.0 HP
		Outdoor unit	RAS-2WHVNP	RAS-2.5WHVNP	RAS-3WHVNP
		Indoor unit	RWM-2.0NE(-W)	RWM-2.5NE(-W)	RWM-3.0NE(-W)
Electrical power input in stand-by mode (Psb)	W		11.9	11.9	11.9
Electrical power input in thermostat-OFF mode (Pto)	W		0.0	0.0	0.0
Electrical power input in OFF mode (Poff)	W		11.9	11.9	11.9
Electrical power input in crankcase heater mode (Pck)	W		0.0	0.0	0.0
Sound power level of indoor unit (L_{WA})	dB(A)		37	37	37
Sound power level of outdoor unit (L_{WA})	dB(A)		61	63	64
Capacity control mode	-		Variable (Inverter)		
Integrated supplementary heater	kW		3.0	3.0	3.0
Nominal outdoor air flow	m^3/h		2436	2436	2682

RAS-(4-6)WHVNPE + RWM-(4.0-6.0)NE(-W)

Model		HP	4.0 HP	5.0 HP	6.0 HP
		Outdoor unit	RAS-4WHVNPE	RAS-5WHVNPE	RAS-6WHVNPE
		Indoor unit	RWM-4.0NE(-W)	RWM-5.0NE(-W)	RWM-6.0NE(-W)
Electrical power input in stand-by mode (Psb)	W		13.1	13.1	13.1
Electrical power input in thermostat-OFF mode (Pto)	W		0.0	0.0	0.0
Electrical power input in OFF mode (Poff)	W		13.1	13.1	13.1
Electrical power input in crankcase heater mode (Pck)	W		0.0	0.0	0.0
Sound power level of indoor unit (L_{WA})	dB(A)		39	39	39
Sound power level of outdoor unit (L_{WA})	dB(A)		64	65	67
Capacity control mode	-		Variable (Inverter)		
Integrated supplementary heater	kW		6.0	6.0	6.0
Nominal outdoor air flow	m^3/h		4800	5400	6000

RAS-(4-6)WHNPE + RWM-(4.0-6.0)NE(-W)

Model		HP	4.0 HP	5.0 HP	6.0 HP
		Outdoor unit	RAS-4WHNPE	RAS-5WHNPE	RAS-6WHNPE
		Indoor unit	RWM-4.0NE(-W)	RWM-5.0NE(-W)	RWM-6.0NE(-W)
Electrical power input in stand-by mode (Psb)	W		19.1	19.1	19.1
Electrical power input in thermostat-OFF mode (Pto)	W		0.0	0.0	0.0
Electrical power input in OFF mode (Poff)	W		19.1	19.1	19.1
Electrical power input in crankcase heater mode (Pck)	W		0.0	0.0	0.0
Sound power level of indoor unit (L_{WA})	dB(A)		39	39	39
Sound power level of outdoor unit (L_{WA})	dB(A)		64	65	67
Capacity control mode	-		Variable (Inverter)		
Integrated supplementary heater	kW		6.0	6.0	6.0
Nominal outdoor air flow	m^3/h		4800	5400	6000

RAS-(8/10)WHNPE + RWM-(8.0/10.0)NE(-W)

Model		HP	8.0 HP	10.0 HP
		Outdoor unit	RAS-8WHNPE	RAS-10WHNPE
		Indoor unit	RWM-8.0NE(-W)	RWM-10.0NE(-W)
Electrical power input in stand-by mode (Psb)	W		36	36
Electrical power input in thermostat-OFF mode (Pto)	W		0.0	0.0
Electrical power input in OFF mode (Poff)	W		36	36
Electrical power input in crankcase heater mode (Pck)	W		0.0	0.0
Sound power level of indoor unit (L_{WA})	dB(A)		47	47
Sound power level of outdoor unit (L_{WA})	dB(A)		73	74
Capacity control mode	-		Variable (Inverter)	
Integrated supplementary heater	kW		9.0	9.0
Nominal outdoor air flow	m^3/h		7620	8040

3.2.2.6 ERP additional data - YUTAKI S COMBI

RAS-(2-3)WHVNP + RWD-(2.0-3.0)NW(S)E-(200/260)S(-K)(-W)

Model	HP		2.0 HP	2.5 HP	3.0 HP
	Outdoor unit		RAS-2WHVNP	RAS-2.5WHVNP	RAS-3WHVNP
	Indoor unit		RWD-2.0NW(S)E (200/260)S(-K)(-W)	RWD-2.5NW(S)E (200/260)S(-K)(-W)	RWD-3.0NW(S)E (200/260)S(-K)(-W)
Electrical power input in stand-by mode (Psb)		W	11.9	11.9	11.9
Electrical power input in thermostat-OFF mode (Pto)		W	0.0	0.0	0.0
Electrical power input in OFF mode (Poff)		W	11.9	11.9	11.9
Electrical power input in crankcase heater mode (Pck)		W	0.0	0.0	0.0
Sound power level of indoor unit (L_{WA})		dB(A)	37	37	37
Sound power level of outdoor unit (L_{WA})		dB(A)	61	63	64
Capacity control mode		-	Variable (Inverter)		
Integrated supplementary heater		kW	3.0	3.0	3.0
Nominal outdoor air flow		m^3/h	2436	2436	2682

RAS-(4-6)WHVNPE + RWD-(4.0-6.0)NW(S)E-(200/260)S(-K)(-W)

Model	HP		4.0 HP	5.0 HP	6.0 HP
	Outdoor unit		RAS-4WHVNPE	RAS-5WHVNPE	RAS-6WHVNPE
	Indoor unit		RWD-4.0NW(S)E (200/260)S(-K)(-W)	RWD-5.0NW(S)E (200/260)S(-K)(-W)	RWD-6.0NW(S)E (200/260)S(-K)(-W)
Electrical power input in stand-by mode (Psb)		W	13.1	13.1	13.1
Electrical power input in thermostat-OFF mode (Pto)		W	0.0	0.0	0.0
Electrical power input in OFF mode (Poff)		W	13.1	13.1	13.1
Electrical power input in crankcase heater mode (Pck)		W	0.0	0.0	0.0
Sound power level of indoor unit (L_{WA})		dB(A)	39	39	39
Sound power level of outdoor unit (L_{WA})		dB(A)	64	65	67
Capacity control mode		-	Variable (Inverter)		
Integrated supplementary heater		kW	6.0	6.0	6.0
Nominal outdoor air flow		m^3/h	4800	5400	6000

RAS-(4-6)WHNPE + RWD-(4.0-6.0)NW(S)E-(200/260)S(-K)(-W)

Model	HP		4.0 HP	5.0 HP	6.0 HP
	Outdoor unit		RAS-4WHNPE	RAS-5WHNPE	RAS-6WHNPE
	Indoor unit		RWD-4.0NW(S)E (200/260)S(-K)(-W)	RWD-5.0NW(S)E (200/260)S(-K)(-W)	RWD-6.0NW(S)E (200/260)S(-K)(-W)
Electrical power input in stand-by mode (Psb)		W	19.1	19.1	19.1
Electrical power input in thermostat-OFF mode (Pto)		W	0.0	0.0	0.0
Electrical power input in OFF mode (Poff)		W	19.1	19.1	19.1
Electrical power input in crankcase heater mode (Pck)		W	0.0	0.0	0.0
Sound power level of indoor unit (L_{WA})		dB(A)	39	39	39
Sound power level of outdoor unit (L_{WA})		dB(A)	64	65	67
Capacity control mode		-	Variable (Inverter)		
Integrated supplementary heater		kW	6.0	6.0	6.0
Nominal outdoor air flow		m^3/h	4800	5400	6000

3.2.2.7 ERP additional data - YUTAKI S80

RAS-(4-6)WHVNPE + RWH-(4.0-6.0)VNF(W)E

Model	HP		4.0 HP	5.0 HP	6.0 HP
	Outdoor unit		RAS-4WHVNPE	RAS-5WHVNPE	RAS-6WHVNPE
	Indoor unit		RWH-4.0VNF(W)E	RWH-5.0VNF(W)E	RWH-6.0VNF(W)E
Electrical power input in stand-by mode (Psb)		W	17.0	17.0	17.0
Electrical power input in thermostat-OFF mode (Pto)		W	0.0	0.0	0.0
Electrical power input in OFF mode (Poff)		W	17.0	17.0	17.0
Electrical power input in crankcase heater mode (Pck)		W	0.0	0.0	0.0
Sound power level of indoor unit (L_{WA})		dB(A)	57	57	58
Sound power level of outdoor unit (L_{WA})		dB(A)	61	63	64
Capacity control mode		-	Variable (Inverter)		
Integrated supplementary heater		kW	No		
Nominal outdoor air flow		m^3/h	4800	5400	6000

RAS-(4-6)WHNPE + RWH-(4.0-6.0)NF(W)E

Model	HP		4.0 HP	5.0 HP	6.0 HP
	Outdoor unit		RAS-4WHNPE	RAS-5WHNPE	RAS-6WHNPE
	Indoor unit		RWH-4.0NF(W)E	RWH-5.0NF(W)E	RWH-6.0NF(W)E
Electrical power input in stand-by mode (Psb)		W	44.0	44.0	44.0
Electrical power input in thermostat-OFF mode (Pto)		W	0.0	0.0	0.0
Electrical power input in OFF mode (Poff)		W	44.0	44.0	44.0
Electrical power input in crankcase heater mode (Pck)		W	0.0	0.0	0.0
Sound power level of indoor unit (L_{WA})		dB(A)	57	57	58
Sound power level of outdoor unit (L_{WA})		dB(A)	61	63	64
Capacity control mode		-	Variable (Inverter)		
Integrated supplementary heater		kW	No		
Nominal outdoor air flow		m^3/h	4800	5400	6000

3.2.2.8 ERP additional data - YUTAKI M

RASM-(3-6)VNE

Model	HP		3.0 HP	4.0 HP	5.0 HP	6.0 HP
			RASM-3VNE	RASM-4VNE	RASM-5VNE	RASM-6VNE
Electrical power input in stand-by mode (Psb)		W	15.0	13.1	13.1	13.1
Electrical power input in thermostat-OFF mode (Pto)		W	0.0	0.0	0.0	0.0
Electrical power input in OFF mode (Poff)		W	15.0	13.1	13.1	13.1
Electrical power input in crankcase heater mode (Pck)		W	0.0	0.0	0.0	0.0
Sound power level of outdoor unit (L_{WA})		dB(A)	64	64	65	67
Capacity control mode		-	Variable (Inverter)			
Integrated supplementary heater		kW	No			
Nominal outdoor air flow		m^3/h	2682	4800	5400	6000

RASM-(4-6)NE

Model	HP		4.0 HP	5.0 HP	6.0 HP
			RASM-4NE	RASM-5NE	RASM-6NE
Electrical power input in stand-by mode (Psb)		W	19.1	19.1	19.1
Electrical power input in thermostat-OFF mode (Pto)		W	0.0	0.0	0.0
Electrical power input in OFF mode (Poff)		W	19.1	19.1	19.1
Electrical power input in crankcase heater mode (Pck)		W	0.0	0.0	0.0
Sound power level of outdoor unit (L_{WA})		dB(A)	64	65	67
Capacity control mode		-	Variable (Inverter)		
Integrated supplementary heater		kW	No		
Nominal outdoor air flow		m^3/h	4800	5400	6000

3.2.3 General ERP data for combi heaters (YUTAKI S COMBI & S80)

3.2.3.1 YUTAKI S COMBI

RAS-(2-3)WH(V)NP + RWD-(2.0-3.0)NW(S)E-(200/260)S(-K)(-W)

Model		HP	2.0 HP		2.5 HP		3.0 HP	
		Outdoor unit	RAS-2WHVNP		RAS-2.5WHVNP		RAS-3WHVNP	
		Indoor unit	RWD-2.0 NWE-200S(-K) (-W)	RWD-2.0NW(S)E-260S(-K) (-W)	RWD-2.5 NWE-200S(-K) (-W)	RWD-2.5 NW(S)E-260S(-K) (-W)	RWD-3.0 NWE-200S-(K) (-W)	RWD-3.0 NW(S)E-260S(-K) (-W)
Declared profile		-	L	XL	L	XL	L	XL
Ability to work during OFF peak hours		-	Yes					
AVERAGE climate								
Water heating energy efficiency (η_{wh})		%	132	136	132	136	132	136
Water heating energy class		-	A+	A+	A+	A+	A+	A+
Daily electricity consumption		kW·h	3.53	5.61	3.53	5.61	3.53	5.61
Annual energy consumption		kW·h	777	1234	777	1234	777	1234
WARMER climate								
Water heating energy efficiency (η_{wh})		%	145	150	145	150	145	150
Daily energy consumption		kW·h	3.21	3.12	3.21	706	3.21	706
Annual energy consumption		kW·h	706	686	3.12	686	3.12	686
COLDER climate								
Water heating energy efficiency (η_{wh})		%	112	116	112	116	112	116
Daily energy consumption		kW·h	4.16	4.03	4.16	4.03	4.16	4.03
Annual energy consumption		kW·h	914	887	914	887	914	887

RAS-(4-6)WH(V)NPE + RWD-(4.0-6.0)NW(S)E-(200/260)S(-K)(-W)

Model		HP	4.0 HP		5.0 HP		6.0 HP	
		Outdoor unit	RAS-4WH(V)NPE		RAS-5WH(V)NPE		RAS-6WH(V)NPE	
		Indoor unit	RWD-4.0 NWE-200S(-K) (-W)	RWD-4.0 NW(S)E-260S(-K) (-W)	RWD-5.0 NWE-200S(-K) (-W)	RWD-5.0 NW(S)E-260S(-K) (-W)	RWD-6.0 NWE-200S(-K) (-W)	RWD-6.0 NW(S)E-260S(-K) (-W)
Declared profile		-	L	XL	L	XL	L	XL
Ability to work during OFF peak hours		-	Yes					
AVERAGE climate								
Water heating energy efficiency (η_{wh})		%	130	134	130	134	130	134
Water heating energy class		-	A+	A+	A+	A+	A+	A+
Daily electricity consumption		kW·h	3.59	5.69	3.59	5.69	3.59	5.69
Annual energy consumption		kW·h	789	1252	789	1252	789	1252
WARMER climate								
Water heating energy efficiency (η_{wh})		%	143	147	143	147	143	147
Daily energy consumption		kW·h	3.26	3.16	3.26	3.16	3.26	3.16
Annual energy consumption		kW·h	717	696	717	696	717	696
COLDER climate								
Water heating energy efficiency (η_{wh})		%	111	114	111	114	111	114
Daily energy consumption		kW·h	4.22	4.09	4.22	4.09	4.22	4.09
Annual energy consumption		kW·h	928	900	928	900	928	900

3.2.3.2 YUTAKI S80

RAS-(4-6)WH(V)NPE + RWH-(4.0-6.0)(V)NFWE + DHWS(200/260)S-2.7H2E(-W)

Model		HP	4.0 HP		5.0 HP		6.0 HP	
		Outdoor unit	RAS-4WH(V)NPE		RAS-5WH(V)NPE		RAS-6WH(V)NPE	
		Indoor unit	RWH-4.0VNFWE		RWH-5.0VNFWE		RWH-6.0VNFWE	
		DHW tank	DHWS200S-2.7H2E(-W)	DHWS260S-2.7H2E(-W)	DHWS200S-2.7H2E(-W)	DHWS260S-2.7H2E(-W)	DHWS200S-2.7H2E(-W)	DHWS260S-2.7H2E(-W)
Declared profile		-	L	XL	L	XL	L	XL
Ability to work during OFF peak hours		-	Yes					
AVERAGE climate								
Water heating energy efficiency (η_{wh})		%	129	133	129	133	129	133
Water heating energy class		-	A+	A+	A+	A+	A+	A+
Daily electricity consumption		kW·h	3.61	5.74	3.61	5.74	3.61	5.74
Annual energy consumption		kW·h	795	1262	795	1262	795	1262
WARMER climate								
Water heating energy efficiency (η_{wh})		%	142	146	142	146	142	146
Daily energy consumption		kW·h	3.29	3.19	3.29	3.19	3.29	3.19
Annual energy consumption		kW·h	723	7.01	723	7.01	723	7.01
COLDER climate								
Water heating energy efficiency (η_{wh})		%	110	113	110	113	110	113
Daily energy consumption		kW·h	4.25	4.12	4.25	4.12	4.25	4.12
Annual energy consumption		kW·h	935	907	935	907	935	907

NOTE

RWH-(V)NFE units are conceived for only heating operation, but a DHW tank could also be installed beside the indoor unit thus providing DHW operation. In this case, the whole system is considered as a "Heat pump combination heater".

3.2.4 General ERP data for hot water storage tanks (YUTAKI S , YUTAKI M & YUTAKI S 80)

Model		DHWT-200S-3.0H2E	DHWT-300S-3.0H2E
Storage volume	L	194	284
Standing loss	W	47.3	62.8
Energy efficiency class	-	B	B

3.3 General specifications

3.3.1 Considerations

- The sound data is based on the following conditions:
  - Outdoor ambient temperature (DB/WB): 7/6ºC.
  - Water inlet/outlet temperature: 47/55ºC (mark: *1); 30/35ºC (mark: *2).
  - Distance of the unit from the measuring point: At 1 meter from the unit's front surface; 1,5 meter from floor level.
  - The sound pressure level is measured in an anechoic chamber, so reflected sound should be taken into consideration when installing the unit.
  - The sound power level is measured in a reverberant room, in accordance with the standard EN12102. Used environment conditions are the same that specified in EN14511 for performance test.
- The nominal water flow rate is calculated under the following conditions:
  - Outdoor ambient temperature (DB/WB): 7/6ºC.
  - Water inlet/outlet temperature: 47/55ºC (mark: *1); 30/35ºC (mark: *2).
- Regarding data market with mark: *3, it corresponds to the height of the unit with the minimum mounting foot height. This value can be adjusted up to +30 mm.
- For specific details about data corresponding to the working range, please refer to the chapter *"6. Working range"*.

Keywords:

- DB: Dry bulb
- WB: Wet bulb

3.3.2 Split system - Outdoor unit

Model			RAS-2WHVNP	RAS-2.5WHVNP	RAS-3WHVNP
Power supply		-	1~ 230V 50Hz		
Noise level (sound pressure)		dB(A)	46	47	*50*
Noise level (sound power)	(*1)	dB(A)	61	63	64
	(*2)	dB(A)	59	60	61
Air flow		m^3/min	40.6	40.6	44.7
Cabinet colour		-	Natural grey (1.0Y 8.5/0.5)		
Dimensions (H x W x D)		mm	600 x 792 x 300		
Net weight		kg	43	43	44
Gross weight		kg	48	48	49
Piping diameter (liquid / gas)		mm (inches)	Ø6.35 (1/4) / Ø12.7 (1/2)	Ø6.35 (1/4) / Ø12.7 (1/2)	Ø9.52 (3/8) / Ø15.88 (5/8)
Minimum piping length		m	5		
Maximum chargeless piping length		m	15		
Maximum piping length (additional refrigerant charge needed)		m (g/m)	50 (30)		50 (40)
Height difference between OU and IU (higher OU / lower OU)		m	30 / 20		
Working range (cooling // heating // DHW)		ºC (DB)	10~46 // -20*~25 // -20*~35		
Refrigerant		-	R410A		
Refrigerant charge before shipment		kg	1.4	1.5	1.7
Compressor type		-	Scroll DC Inverter driven		Rotary DC Inverter driven

Model			RAS-4WHVNPE	RAS-5WHVNPE	RAS-6WHVNPE
Power supply		-	1~ 230V 50Hz		
Noise level (sound pressure)		dB(A)	49	50	*50*
Noise level (sound power)	(*1)	dB(A)	64	65	67
	(*2)	dB(A)	63	64	65
Air flow		m^3/min	80	90	100
Cabinet colour		-	Natural grey (1.0Y 8.5/0.5)		
Dimensions (H x W x D)		mm	1380 x 950 x 370		
Net weight		kg	103	103	103
Gross weight		kg	116	116	116
Piping diameter (liquid / gas)		mm (inches)	Ø9.52 (3/8) / Ø15.88 (5/8)	Ø9.52 (3/8) / Ø15.88 (5/8)	Ø9.52 (3/8) / Ø15.88 (5/8)
Minimum piping length		m	5		
Maximum chargeless piping length		m	15		
Maximum piping length (additional refrigerant charge needed)		m (g/m)	75 (60)		
Height difference between OU and IU (higher OU / lower OU)		m	30 / 20		
Working range (cooling // heating // DHW)*		ºC (DB)	10~46 // -25~25 // -25~35		
Refrigerant		-	R410A		
Refrigerant charge before shipment		kg	3.3	3.4	3.4
Compressor type		-	Scroll DC Inverter driven		

NOTE

** For detail, please refer to "6. Working range" chapter*

Model			RAS-4WHNPE	RAS-5WHNPE	RAS-6WHNPE
Power supply		-	3N~ 400V 50Hz		
Noise level (sound pressure)		dB(A)	49	50	50
Noise level (sound power)	(*1)	dB(A)	64	65	67
	(*2)	dB(A)	63	64	65
Air flow		m^3/min	80	90	100
Cabinet colour		-	Natural grey (1.0Y 8.5/0.5)		
Dimensions (H x W x D)		mm	1380 x 950 x 370		
Net weight		kg	103	103	103
Gross weight		kg	116	116	116
Piping diameter (liquid / gas)		mm (inches)	Ø9.52 (3/8) / Ø15.88 (5/8)	Ø9.52 (3/8) / Ø15.88 (5/8)	Ø9.52 (3/8) / Ø15.88 (5/8)
Minimum piping length		m	5		
Maximum chargeless piping length		m	15		
Maximum piping length (additional refrigerant charge needed)		m (g/m)	75 (60)		
Height difference between OU and IU (higher OU / lower OU)		m	30 / 20		
Working range (cooling // heating // DHW)*		ºC (DB)	10~+46 // -25~+25 // -25~+35		
Refrigerant		-	R410A		
Refrigerant charge before shipment		kg	3.3	3.4	3.4
Compressor type		-	Scroll DC Inverter driven		

Model			RAS-8WHNPE	RAS-10WHNPE
Power supply		-	3N~ 400V 50Hz	
Noise level (sound pressure)		dB(A)	59	60
Noise level (sound power)	(*1)	dB(A)	73	74
	(*2)	dB(A)	71	72
Air flow		m^3/min	127	134
Cabinet colour		-	Natural grey (1.0Y 8.5/0.5)	
Dimensions (H x W x D)		mm	1380 x 950 x 370	
Net weight		kg	137	139
Gross weight		kg	152	154
Piping diameter (liquid / gas)		mm (inches)	Ø9.52 (3/8) / Ø25.4	Ø12.70 (1/2) / Ø25.4
Minimum piping length		m	5	
Maximum chargeless piping length		m	15	
Maximum piping length (additional refrigerant charge needed)		m (g/m)	70 (65)	
Height difference between OU and IU (higher OU / lower OU)		m	30 / 20	
Working range (cooling // heating // DHW)*		ºC (DB)	10~+46 // -25~+25 // -25~+35	
Refrigerant		-	R410A	
Refrigerant charge before shipment		kg	5.0	5.3
Compressor type		-	Scroll DC Inverter driven	

3.3.3 Split system - Indoor unit

3.3.3.1 YUTAKI S

Model			RWM-2.0NE(-W)	RWM-2.5NE(-W)	RWM-3.0NE(-W)
Power supply		-	1~ 230V 50Hz		
Noise level (sound power)		dB(A)	37	37	37
Nominal water flow	WIT: 30 ºC / WOT: 35 ºC ΔT: 5 ºC	m^3/h	0.77	1.03	1.29
Cabinet	Material	-	Precoated galvanised steel		
	Colour	-	Pure white (RAL 9010)		
Unit dimensions	Height (with connections)	mm	712 (782)		
	Width	mm	450		
	Depth	mm	275		
Packaging dimensions	Height	mm	468		
	Width	mm	905		
	Depth	mm	539		
Packaging volume		m^3	0.23		
Packaging materials		-	Wood - Carton - Plastic		
Net weight		kg	35	36	37
Gross weight		kg	44	45	46
Refrigerant pipes connection	Connection type	-	Flare nut connection		
	Liquid pipe diameter	mm (inches)	Ø6.35 (1/4")	Ø9.52 (3/8")	
	Gas pipe diameter	mm (inches)	Ø15.88 (5/8")		
Space heating pipes connection	Connection type	-	Screwed connection		
	Shut-off valves	mm (inches)	G 1" (male) - G 1" (male)		
	Inlet pipe diameter	mm (inches)	G 1" (female)		
	Outlet pipe diameter	mm (inches)	G 1" (female)		
Working range (Heating)	Outdoor ambient temperature	ºC (DB)	-20*~25		
	Outlet water temperature	ºC	20~55		
Working range (Cooling)	Outdoor ambient temperature	ºC (DB)	10~46		
	Outlet water temperature	ºC	5~22		
Working range (DHW)	Outdoor ambient temperature	ºC (DB)	-15~35		
	Tank water temperature	ºC	30~75		

NOTE

** For detail, please refer to "6. Working range" chapter*

Model			RWM-4.0NE(-W)	RWM-5.0NE(-W)	RWM-6.0NE(-W)
Power supply		-	1~ 230V 50Hz / 3N~ 400V 50Hz		
Noise level (sound power)		dB(A)	39	39	39
Nominal water flow	WIT: 30 ºC / WOT: 35 ºC ΔT: 5 ºC	m^3/h	1.89	2.41	2.75
Cabinet	Material	-	Precoated galvanised steel		
	Colour	-	Pure white (RAL 9010)		
Unit dimensions	Height (with connections)	mm	890 (960)		
	Width	mm	520		
	Depth	mm	360		
Packaging dimensions	Height	mm	546		
	Width	mm	1120		
	Depth	mm	610		
Packaging volume		m^3	0.37		
Packaging materials		-	Wood - Carton - Plastic		
Net weight		kg	46	48	
Gross weight		kg	61	63	
Refrigerant pipes connection	Connection type	-	Flare nut connection		
	Liquid pipe diameter	mm (inches)	Ø9.52 (3/8”)		
	Gas pipe diameter	mm (inches)	Ø15.88 (5/8”)		
Space heating pipes connection	Connection type	-	Screwed connection		
	Shut-off valves	mm (inches)	G 1-1/4” (male) - G 1-1/4” (male)		
	Inlet pipe diameter	mm (inches)	G 1-1/4” (female)		
	Outlet pipe diameter	mm (inches)	G 1-1/4” (female)		
Working range (Heating)	Outdoor ambient temperature	ºC (DB)	-25~25		
	Outlet water temperature	ºC	20~60		
Working range (Cooling)	Outdoor ambient temperature	ºC (DB)	10~46		
	Outlet water temperature	ºC	5~22		
Working range (DHW)	Outdoor ambient temperature	ºC (DB)	-25~35		
	Tank water temperature	ºC	30~75		

Model			RWM-8.0NE(-W)	RWM-10.0NE(-W)
Power supply		-	3N~ 400V 50Hz	
Noise level (sound power)		dB(A)	47	47
Nominal water flow	WIT: 30 °C / WOT: 35 °C ΔT: 5 °C	m^3/h	3.44	4.13
Cabinet	Material	-	Precoated galvanised steel	
	Colour	-	Pure white (RAL 9010)	
Unit dimensions	Height (with connections)	mm	890 (960)	
	Width	mm	670	
	Depth	mm	360	
Packaging dimensions	Height	mm	546	
	Width	mm	1120	
	Depth	mm	760	
Packaging volume		m^3	0.46	
Packaging materials		-	Wood - Carton - Plastic	
Net weight		kg	60	62
Gross weight		kg	76	78
Refrigerant pipes connection	Connection type	-	Liquid pipe: Flare nut connection; Gas pipe: Brazed connection	
	Liquid pipe diameter	mm (inches)	Ø9.52 (3/8")	Ø12.7 (1/2")
	Gas pipe diameter	mm (inches)	Ø25.4 (1")	
Space heating pipes connection	Connection type	-	Screwed connection	
	Shut-off valves	mm (inches)	G 1-1/4" (male) - G 1-1/4" (male)	
	Inlet pipe diameter	mm (inches)	G 1-1/4" (female)	
	Outlet pipe diameter	mm (inches)	G 1-1/4" (female)	
Working range (Heating)	Outdoor ambient temperature	°C (DB)	-25~25	
	Outlet water temperature	°C	20~60	
Working range (Cooling)	Outdoor ambient temperature	°C (DB)	10~46	
	Outlet water temperature	°C	5~22	
Working range (DHW)	Outdoor ambient temperature	°C (DB)	-25~35	
	Tank water temperature	°C	30~75	

3.3.3.2 YUTAKI S COMBI

◆ Standard model

Model			RWD-2.0NWE-(200/260)S(-W)	RWD-2.5NWE-(200/260)S(-W)	RWD-3.0NWE-(200/260)S(-W)
Power supply		-	1~ 230V 50Hz		
Noise level (sound power)		dB(A)	37	37	37
Nominal water flow	WIT: 30 ºC / WOT: 35 ºC ΔT: 5 ºC	m^3/h	0.77	1.03	1.29
Cabinet	Material	-	Precoated galvanised steel		
	Colour	-	Pure white (RAL 9010)		
Unit dimensions	Height (with connections)	mm	1750 (1816) (*3)		
	Width	mm	600		
	Depth	mm	733		
Packaging dimensions	Height	mm	1950		
	Width	mm	651		
	Depth	mm	770		
Packaging volume		m^3	0.98		
Packaging materials		-	Wood - Carton - Plastic		
Net weight	Tank model: 200 L	kg	121	122	
	Tank model: 260 L		131	132	
Gross weight	Tank model: 200 L	kg	132	133	
	Tank model: 260 L		142	143	
Refrigerant pipes connection	Connection type	-	Flare nut connection		
	Liquid pipe diameter	mm (inches)	Ø6.35 (1/4")	Ø9.52 (3/8")	
	Gas pipe diameter	mm (inches)	Ø15.88 (5/8")		
Space heating pipes connection	Connection type	-	Screwed connection		
	Shut-off valves	mm (inches)	G 1" (male) - G 1" (male)		
	Inlet pipe diameter	mm (inches)	G 1" (female)		
	Outlet pipe diameter	mm (inches)	G 1" (female)		
DHW pipes connection	Connection type	-	Screwed connection		
	Inlet pipe diameter	mm (inches)	G 3/4" (female)		
	Outlet pipe diameter	mm (inches)	G 3/4" (female)		
Working range (Heating)	Outdoor ambient temperature *	ºC (DB)	-20~25		
	Outlet water temperature	ºC	20~55		
Working range (Cooling)	Outdoor ambient temperature	ºC (DB)	10~46		
	Outlet water temperature	ºC	5~22		
Working range (DHW)	Outdoor ambient temperature	ºC (DB)	-15~35		
	Tank water temperature	ºC	30~75		

NOTE

** For detail, please refer to "6. Working range" chapter*

Model			RWD-4.0NWE-(200/260)S(-W)	RWD-5.0NWE-(200/260)S(-W)	RWD-6.0NWE-(200/260)S(-W)
Power supply		-	1~ 230V 50Hz / 3N~ 400V 50Hz		
Noise level (sound power)		dB(A)	39	39	39
Nominal water flow	WIT: 30 ºC / WOT: 35 ºC ΔT: 5 ºC	m^3/h	1.89	2.41	2.75
Cabinet	Material	-	Precoated galvanised steel		
	Colour	-	Pure white (RAL 9010)		
Unit dimensions	Height (with connections)	mm	1750 (1816) (*3)		
	Width	mm	600		
	Depth	mm	733		
Packaging dimensions	Height	mm	1950		
	Width	mm	651		
	Depth	mm	770		
Packaging volume		m^3	0.98		
Packaging materials		-	Wood - Carton - Plastic		
Net weight	Tank model: 200 L	kg	120	122	
	Tank model: 260 L		130	132	
Gross weight	Tank model: 200 L	kg	131	133	
	Tank model: 260 L		141	143	
Refrigerant pipes connection	Connection type	-	Flare nut connection		
	Liquid pipe diameter	mm (inches)	Ø9.52 (3/8”)		
	Gas pipe diameter	mm (inches)	Ø15.88 (5/8”)		
Space heating pipes connection	Connection type	-	Screwed connection		
	Shut-off valves	mm (inches)	G 1-1/4” (male) - G 1-1/4” (male)		
	Inlet pipe diameter	mm (inches)	G 1-1/4” (female)		
	Outlet pipe diameter	mm (inches)	G 1-1/4” (female)		
DHW pipes connection	Connection type	-	Screwed connection		
	Inlet pipe diameter	mm (inches)	G 3/4” (female)		
	Outlet pipe diameter	mm (inches)	G 3/4” (female)		
Working range (Heating)	Outdoor ambient temperature	ºC (DB)	-25~25		
	Outlet water temperature	ºC	20~60		
Working range (Cooling)	Outdoor ambient temperature	ºC (DB)	10~46		
	Outlet water temperature	ºC	5~22		
Working range (DHW)	Outdoor ambient temperature	ºC (DB)	-25~35		
	Tank water temperature	ºC	30~75		

◆ Model for solar combination

Model			RWD-2.0NWSE-260S(-W)	RWD-2.5NWSE-260S(-W)	RWD-3.0NWSE-260S(-W)
Power supply		-	1~ 230V 50Hz		
Noise level (sound power)		dB(A)	37	37	37
Nominal water flow	WIT: 30 ºC / WOT: 35 ºC ΔT: 5 ºC	m^3/h	0.77	1.03	1.29
Cabinet	Material	-	Precoated galvanised steel		
	Colour	-	Pure white (RAL 9010)		
Unit dimensions	Height (with connections)	mm	1750 (1816) (*3)		
	Width	mm	600		
	Depth	mm	733		
Packaging dimensions	Height	mm	1950		
	Width	mm	651		
	Depth	mm	770		
Packaging volume		m^3	0.98		
Packaging materials		-	Wood - Carton - Plastic		
Net weight		kg	131	132	
Gross weight		kg	142	143	
Refrigerant pipes connection	Connection type	-	Flare nut connection		
	Liquid pipe diameter	mm (inches)	Ø6.35 (1/4")	Ø9.52 (3/8")	
	Gas pipe diameter	mm (inches)	Ø15.88 (5/8")		
Space heating pipes connection	Connection type	-	Screwed connection		
	Shutdown valves	mm (inches)	G 1" (male) - G 1" (male)		
	Inlet pipe diameter	mm (inches)	G 1" (female)		
	Outlet pipe diameter	mm (inches)	G 1" (female)		
DHW pipes connection	Connection type	-	Screwed connection		
	Inlet pipe diameter	mm (inches)	G 3/4" (female)		
	Outlet pipe diameter	mm (inches)	G 3/4" (female)		
Solar pipes connection	Connection type	-	Screwed connection		
	Inlet pipe diameter	mm (inches)	G 1/2" (male)		
	Outlet pipe diameter	mm (inches)	G 1/2" (male)		
Working range (Heating)	Outdoor ambient temperature *	ºC (DB)	-20~25		
	Outlet water temperature	ºC	20~55		
Working range (Cooling)	Outdoor ambient temperature	ºC (DB)	10~46		
	Outlet water temperature	ºC	5~22		
Working range (DHW)	Outdoor ambient temperature	ºC (DB)	-15~35		
	Tank water temperature	ºC	30~75		

NOTE

** For detail, please refer to "6. Working range" chapter*

Model			RWD-4.0NWSE-260S(-W)	RWD-5.0NWSE-260S(-W)	RWD-6.0NWSE-260S(-W)
Power supply		-	1~ 230V 50Hz / 3N~ 400V 50Hz		
Noise level (sound power)		dB(A)	39	39	39
Nominal water flow	WIT: 30 ºC / WOT: 35 ºC ΔT: 5 ºC	m^3/h	1.89	2.41	2.75
Cabinet	Material	-	Precoated galvanised steel		
	Colour	-	Pure white (RAL 9010)		
Unit dimensions	Height (with connections)	mm	1750 (1816) (*3)		
	Width	mm	600		
	Depth	mm	733		
Packaging dimensions	Height	mm	1950		
	Width	mm	651		
	Depth	mm	770		
Packaging volume		m^3	0.98		
Packaging materials		-	Wood - Carton - Plastic		
Net weight		kg	130	132	
Gross weight		kg	141	143	
Refrigerant pipes connection	Connection type	-	Flare nut connection		
	Liquid pipe diameter	mm (inches)	Ø9.52 (3/8")		
	Gas pipe diameter	mm (inches)	Ø15.88 (5/8")		
Space heating pipes connection	Connection type	-	Screwed connection		
	Shut-off valves	mm (inches)	G 1-1/4" (male) - G 1-1/4" (male)		
	Inlet pipe diameter	mm (inches)	G 1-1/4" (female)		
	Outlet pipe diameter	mm (inches)	G 1-1/4" (female)		
DHW pipes connection	Connection type	-	Screwed connection		
	Inlet pipe diameter	mm (inches)	G 3/4" (female)		
	Outlet pipe diameter	mm (inches)	G 3/4" (female)		
Solar pipes connection	Connection type	-	Screwed connection		
	Inlet pipe diameter	mm (inches)	G 1/2" (male)		
	Outlet pipe diameter	mm (inches)	G 1/2" (male)		
Working range (Heating)	Outdoor ambient temperature	ºC (DB)	-25~25		
	Outlet water temperature	ºC	20~60		
Working range (Cooling)	Outdoor ambient temperature	ºC (DB)	10~46		
	Outlet water temperature	ºC	5~22		
Working range (DHW)	Outdoor ambient temperature	ºC (DB)	-25~35		
	Tank water temperature	ºC	30~75		

◆ Model for UK market

Model			RWD-2.0NWE-(200/260)S-K	RWD-2.5NWE-(200/260)S-K	RWD-3.0NWE-(200/260)S-K
Power supply		-	1~ 230V 50Hz		
Noise level (sound power)		dB(A)	37	37	37
Nominal water flow	WIT: 30 ºC / WOT: 35 ºC ΔT: 5 ºC	m^3/h	0.77	1.03	1.29
Cabinet	Material	-	Precoated galvanised steel		
	Colour	-	Pure white (RAL 9010)		
Unit dimensions	Height (with connections)	mm	1750 (1816) (*3)		
	Width	mm	600		
	Depth	mm	733		
Packaging dimensions	Height	mm	1950		
	Width	mm	651		
	Depth	mm	770		
Packaging volume		m^3	0.98		
Packaging materials		-	Wood - Carton - Plastic		
Net weight	Tank model: 200 L	kg	121	122	
	Tank model: 260 L		131	132	
Gross weight	Tank model: 200 L	kg	132	133	
	Tank model: 260 L		142	143	
Refrigerant pipes connection	Connection type	-	Flare nut connection		
	Liquid pipe diameter	mm (inches)	Ø6.35 (1/4”)	Ø9.52 (3/8”)	
	Gas pipe diameter	mm (inches)	Ø15.88 (5/8”)		
Space heating pipes connection	Connection type	-	Screwed connection		
	Shut-off valves	mm (inches)	G 1” (male) - G 1” (male)		
	Inlet pipe diameter	mm (inches)	G 1” (female)		
	Outlet pipe diameter	mm (inches)	G 1” (female)		
DHW pipes connection	Connection type	-	Screwed connection		
	Inlet pipe diameter	mm (inches)	G 3/4” (female)		
	Outlet pipe diameter	mm (inches)	G 3/4” (female)		
Working range (Heating)	Outdoor ambient temperature *	ºC (DW)	-20~25		
	Outlet water temperature	ºC	20~55		
Working range (Cooling)	Outdoor ambient temperature	ºC (DB)	10~46		
	Outlet water temperature	ºC	5~22		
Working range (DHW)	Outdoor ambient temperature	ºC (DB)	-15~35		
	Tank water temperature	ºC	30~75		

NOTE

** For detail, please refer to "6. Working range"e chapter*

Model			RWD-4.0NWE-(200/260)S-K	RWD-5.0NWE-(200/260)S-K	RWD-6.0NWE-(200/260)S-K
Power supply		-	1~ 230V 50Hz / 3N~ 400V 50Hz		
Noise level (sound power)		dB(A)	39	39	39
Nominal water flow	WIT: 30 ºC / WOT: 35 ºC ΔT: 5 ºC	m^3/h	1.89	2.41	2.75
Cabinet	Material	-	Precoated galvanised steel		
	Colour	-	Pure white (RAL 9010)		
Unit dimensions	Height (with connections)	mm	1750 (1816) (*3)		
	Width	mm	600		
	Depth	mm	733		
Packaging dimensions	Height	mm	1950		
	Width	mm	651		
	Depth	mm	770		
Packaging volume		m^3	0.98		
Packaging materials		-	Wood - Carton - Plastic		
Net weight	Tank model: 200 L	kg	120	122	
	Tank model: 260 L		130	132	
Gross weight	Tank model: 200 L	kg	131	133	
	Tank model: 260 L		141	143	
Refrigerant pipes connection	Connection type	-	Flare nut connection		
	Liquid pipe diameter	mm (inches)	Ø9.52 (3/8”)		
	Gas pipe diameter	mm (inches)	Ø15.88 (5/8”)		
Space heating pipes connection	Connection type	-	Screwed connection		
	Shut-off valves	mm (inches)	G 1-1/4” (male) - G 1-1/4” (male)		
	Inlet pipe diameter	mm (inches)	G 1-1/4” (female)		
	Outlet pipe diameter	mm (inches)	G 1-1/4” (female)		
DHW pipes connection	Connection type	-	Screwed connection		
	Inlet pipe diameter	mm (inches)	G 3/4” (female)		
	Outlet pipe diameter	mm (inches)	G 3/4” (female)		
Working range (Heating)	Outdoor ambient temperature	ºC (DB)	-25~25		
	Outlet water temperature	ºC	20~60		
Working range (Cooling)	Outdoor ambient temperature	ºC (DB)	10~46		
	Outlet water temperature	ºC	5~22		
Working range (DHW)	Outdoor ambient temperature	ºC (DB)	-25~35		
	Tank water temperature	ºC	30~75		

3.3.3.3 YUTAKI S80

◆ Indoor unit

Version for indoor unit alone

Model			RWH-4.0(V)NFE	RWH-5.0(V)NFE	RWH-6.0(V)NFE
Power supply		-	RWH-(4.0-6.0)VNFE: 1~ 230V 50Hz RWH-(4.0-6.0)NFE: 3N~ 400V 50Hz		
Nominal water flow	WIT: 47 ºC / WOT: 55 ºC ΔT: 5 ºC	m^3/h	1.26	1.64	1.83
	WIT: 55 ºC / WOT: 65 ºC ΔT: 10 ºC	m^3/h	1.00	1.20	1.38
Noise level (sound power)		dB(A)	57	57	58
Cabinet	Material	-	Precoated galvanised steel		
	Colour	-	Pure white (RAL 9010)		
Unit dimensions	Height (with connections) (*)	mm	751 (802) (*3)		
	Width	mm	600		
	Depth	mm	623		
Packaging dimensions	Height	mm	982		
	Width	mm	675		
	Depth	mm	671		
Packaging volume		m^3	0.44		
Packaging materials		-	Wood - Carton - Plastic - Polypropylene bands		
Net weight (1~ / 3N~)		kg	125 / 127	129 / 136	
Gross weight (1~ / 3N~)		kg	136 / 138	140 / 147	
Refrigerant pipes connection	Connection type	-	Flare nut connection		
	Liquid pipe diameter	mm (inches)	Ø9.52 (3/8")		
	Gas pipe diameter	mm (inches)	Ø15.88 (5/8")		
Space heating pipes connection	Connection type	-	Screwed connection		
	Shut-off valves	mm (inches)	G 1-1/4" (male) - G 1-1/4" (male)		
	Inlet pipe diameter	mm (inches)	G 1-1/4" (female)		
	Outlet pipe diameter	mm (inches)	G 1-1/4" (female)		
Working range (Heating)	Outdoor ambient temperature	ºC (DB)	-25~25		
	Outlet water temperature	ºC	20~80		
Working range (DHW)	Outdoor ambient temperature	ºC (DB)	-25~35		
	Tank water temperature	ºC	30~75		
Refrigerant		-	R-134a		
Refrigerant charge		kg	1.9		
Compressor type		-	Scroll DC Inverter driven		

Version for combination with DHW tank

Model			RWH-4.0(V)NFWE	RWH-5.0(V)NFWE	RWH-6.0(V)NFWE
Power supply		-	RWH-(4.0-6.0)VNFWE: 1~ 230V 50Hz RWH-(4.0-6.0)NFWE: 3N~ 400V 50Hz		
Nominal water flow	WIT: 47 ºC / WOT: 55 ºC ΔT: 5 ºC	m^3/h	1.26	1.64	1.83
	WIT: 55 ºC / WOT: 65 ºC ΔT: 10 ºC	m^3/h	1.00	1.20	1.38
Noise level (sound power)		dB(A)	57	57	58
Cabinet	Material	-	Precoated galvanised steel		
	Colour	-	Pure white (RAL 9010)		
Unit dimensions	Height	mm	751 (*3)		
	Width	mm	600		
	Depth (with connections)	mm	623 (680)		
Packaging dimensions	Height	mm	926		
	Width	mm	728		
	Depth	mm	671		
Packaging volume		m^3	0.45		
Packaging materials		-	Wood - Carton - Plastic - Polypropylene bands		
Net weight (1~ / 3N~)		kg	135 / 137	139 / 146	
Gross weight (1~ / 3N~)		kg	146 / 148	150 / 157	
Refrigerant pipes connection	Connection type	-	Flare nut connection		
	Liquid pipe diameter	mm (inches)	Ø9.52 (3/8”)		
	Gas pipe diameter	mm (inches)	Ø15.88 (5/8”)		
Space heating pipes connection	Connection type	-	Screwed connection		
	Shut-off valves	mm (inches)	G 1-1/4” (male) - G 1-1/4” (male)		
	Inlet pipe diameter	mm (inches)	G 1-1/4” (female)		
	Outlet pipe diameter	mm (inches)	G 1-1/4” (female)		
Heating coil pipes connection (*)	Connection type	-	Flexible pipe connection		
	Inlet connection diameter (3-way valve)	mm (inches)	Flexible pipe (G 1” male)		
	Outlet connection diameter (T-branch)	mm (inches)	Flexible pipe (G 1” male)		
Working range (Heating)	Outdoor ambient temperature	ºC (DB)	-25~25		
	Outlet water temperature	ºC	20~80		
Working range (DHW)	Outdoor ambient temperature	ºC (DB)	-25~35		
	Tank water temperature	ºC	30~75		
Refrigerant		-	R-134a		
Refrigerant charge		kg	1.9		
Compressor type		-	Scroll DC Inverter driven		

(*): These models are ready for combination with YUTAKI S80 DHW tank accessory. In this case, the two flexible water pipes factory-supplied with the DHW tank must be connected to the 3-way valve and T-branch connections of the indoor unit.

◆ Domestic hot water tank

Model				DHWS200S-2.7H2E(-W)	DHWS260S-2.7H2E(-W)
Power supply			-	1~ 230V 50Hz	
Cabinet	Material		-	Precoated galvanised steel	
	Colour		-	Pure white (RAL 9010)	
Unit dimensions	Height	Separated tank	mm	1282 (*3)	1591 (*3)
		Integrated tank		1980 (*3)	2289 (*3)
	Width		mm	600	
	Depth (with connections)		mm	648 (675)	
Packaging dimensions	Height		mm	1444	1753
	Width		mm	644	
	Depth		mm	722	
Packaging volume			m^3	0.67	0.82
Packaging material			-	Wood - Carton - Plastic - Polypropylene bands	
Net weight			kg	62	81
Gross weight			kg	72	92
Tank	Net water volume		L	190	250
	Material		-	AISI 444	
	Maximum tank working temperature		ºC	75	
	Maximum tank water working pressure		bar	10	
	Maximum heating coil water working temperature		ºC	75	
	Maximum heating coil water working pressure		bar	3	
Tank insulation	Material		-	NEOPOR	
	Thickness		mm	50	
Heat exchanger	Quantity		-	1	
	Coil surface area		m^2	1.6	
Tank's heater	Quantity		-	1	
	Heater rating		kW	2.7	
	Type		-	Immersion heater type	
Piping connections	Heating coil inlet connection		inches	Flexible pipe (G 1" male)	
	Heating coil outlet connection		inches	Flexible pipe (G 1" male)	
	DHW inlet connection		inches	Flexible pipe (G 3/4" male)	
	DHW outlet connection		inches	Flexible pipe (G 3/4" male)	
Mechanical thermostat (adjustable and security)			-	Yes (adjustable 28~80ºC ; cut-out: 90ºC)	
Protection			-	Anode protection	
Wired remote controller			-	PC-ARFHE	

3.3.4 Monobloc system - YUTAKI M

Model				RASM-3VNE	RASM-4VNE	RASM-5VNE	RASM-6VNE
Power supply			-	1~ 230V 50Hz			
Noise level (sound power)		(*1)	dB(A)	64	64	65	69
		(*2)	dB(A)	61	63	64	65
Nominal water flow	WIT: 30 ºC / WOT: 35 ºC ΔT: 5 ºC		m^3/h	1.29	1.89	2.41	2.75
Cabinet	Material		-	Precoated galvanised steel			
	Colour		-	Natural grey (1.0Y 8.5/0.5)			
Unit dimensions	Height		mm	800	1380		
	Width		mm	1252	1252		
	Depth		mm	370	370		
Packaging dimensions	Height		mm	935	1515		
	Width		mm	1312			
	Depth		mm	460			
Packaging volume			m^3	0.56	0.91		
Packaging materials			-	Paper + Wood + Plastic			
Net weight			kg	87	131	133	133
Gross weight			kg	105	151	153	153
Space heating pipes connection	Connection type		-	Screwed connection			
	Shut-off valves		mm (inches)	G 1” (male) - G 1” (male)	G 1-1/4” (male) - G 1-1/4” (male)		
	Inlet pipe diameter		mm (inches)	G 1” (female)	G 1-1/4” (female)		
	Outlet pipe diameter		mm (inches)	G 1” (female)	G 1-1/4” (female)		
Working range (Heating)	Outdoor ambient temperature		ºC (DB)	-25~25			
	Outlet water temperature		ºC	20~55	20~60		
Working range (Cooling)	Outdoor ambient temperature		ºC (DB)	10~46			
	Outlet water temperature		ºC	5~22			
Working range (DHW)	Outdoor ambient temperature		ºC (DB)	-25~35			
	Tank water temperature		ºC	30~75			
Refrigerant			-	R410A			
Refrigerant charge			kg	2.4	2.8	3.1	3.1
Compressor type			-	Rotary DC Inverter driven	Scroll DC Inverter driven		

Model				RASM-4NE	RASM-5NE	RASM-6NE
Power supply			-	3N~ 400V 50Hz		
Noise level (sound power)		(*1)	dB(A)	64	65	69
		(*2)	dB(A)	63	64	65
Cabinet	Material		-	Precoated galvanised steel		
	Colour		-	Natural grey (1.0Y 8.5/0.5)		
Unit dimensions	Height		mm	1380		
	Width		mm	1252		
	Depth		mm	370		
Packaging dimensions	Height		mm	1515		
	Width		mm	1312		
	Depth		mm	460		
Packaging volume			m^3	0.91		
Packaging materials			-	Paper + Wood + Plastic		
Net weight			kg	130	132	132
Gross weight			kg	150	152	152
Space heating pipes connection	Connection type		-	Screwed connection		
	Shut-off valves		mm (inches)	G 1-1/4” (male) - G 1-1/4” (male)		
	Inlet pipe diameter		mm (inches)	G 1-1/4” (female)		
	Outlet pipe diameter		mm (inches)	G 1-1/4” (female)		
Working range (Heating)	Outdoor ambient temperature		ºC (DB)	-25~25		
	Outlet water temperature		ºC	20~60		
Working range (Cooling)	Outdoor ambient temperature		ºC (DB)	10~46		
	Outlet water temperature		ºC	5~22		
Working range (DHW)	Outdoor ambient temperature		ºC (DB)	-25~35		
	Tank water temperature		ºC	30~75		
Refrigerant			-	R410A		
Refrigerant charge			kg	2.8	3.1	3.1
Compressor type			-	Scroll DC Inverter driven		

3.3.5 Domestic Hot Water Tank

Model				DHWT-200S-3.0H2E	DHWT-300S-3.0H2E
Casing	Color			White	
	Material			Polypropylene jacked	
Dimensions	Packing	Height	mm	1300	1880
		Width	mm	600	600
		Depth	mm	600	600
	Unit	Height	mm	1270	1750
		Width	mm	595	595
		Depth	mm	595	595
Weight	Unit		kg	53	63
	Packed unit		kg	63.5	73
Packing	Material			EPS	
				CARTON	
	Weight		kg	10.5	11
Main components	Tank	Water volume	L	194	282
		Material		Stainless Steel	
		Max tank temperature	°C	75	75
		Max tank water pressure	bar	10	10
		Maximum heating coil water working temperature	°C	99	99
		Maximum heating coil water working pressure	bar	10	10
Tank	Insulation	Material		Polyurethane	
		Heat loss (*)	kW·h/day	1.128	1.512
		Min thickness	mm	50	50
Main components	Heat exchanger	Quantity		1	1
		Coil surface area	m^2	1.4	1.8
	Booster heater	Quantity		1	1
		Heater rating	kW	3	3
	Type			Immersion heater type	
Piping connections	Water inlet domestic connection		inches	¾ (female)	
	Water outlet domestic connection		inches	¾ (female)	
	Recirculation		inches	¾ (female)	
	In coil connection		inches	¾ (female)	
	Out coil connection		inches	¾ (female)	
Thermometer				Yes	
Mechanical thermostat (security)				Yes	
Protection				-	

NOTE

- *(*): Heat loss according to DIN-4753/8*
- *Storage temperature: 65ºC*
- *Ambient temperature: 20ºC DB*

3.3.6 Complementary system - YUTAKI CASCADE CONTROLLER

YUTAKI CASCADE CONTROLLER - ATW-YCC-(01-02)	
Power supply	1~ 230 V 50 Hz
Max. current (with DHWT E.Heater) / Max. current (Only E.BOX)	19 A / 5 A
Max. input (with DHWT E.Heater) / Max. input (Only E.BOX)	3.2 kW / 0.8 kW
Ambient temperature range in operation	0 to 40 ºC
Humidity range in operation	0 to 80% RH non-condensing
Product dimensions	490 x 360 x 100 mm
Packaging dimensions	510 x 380 x 150 mm
Net weight	5.45 kg
Colour of the cover	White, RAL 9016
Max. diameter of power wiring harness	12 mm

3.4 Component data

3.4.1 Split system - Outdoor unit

MODEL			RAS-2WHVNP	RAS-2.5WHVNP	RAS-3WHVNP
Air heat exchanger	Type		Multi-pass cross-finned tube		
	Pipe material		Copper		
	Outer diameter	mm	8		
	Rows		2		
	Number of tubes in the heat exchanger		44		
	Fin material		Aluminium		
	Fin pitch		1.45		
	Maximum operating pressure	MPa	4.15		
	Total front area	m^2	0.47		
	Number of heat exchanger per unit		1		
Fan	Fan type		Direct drive propeller fan		
	Fans per unit		1		
	Outer diameter	mm	449		
	Revolutions	rpm	770		850
	Nominal air flow	m^3/min	41		45
Motor	Shell		Drip-proof type enclosure		
	Starting		Direct current control		
	Power	W	40		
	Quantity		1		
	Insulation class		E		
Compressor	Model		EU1114D9	EU140XA2	2YC45KXD
	Oil Type		HAF68D1 or 68HES-H		FVC50K
	Quantity (l)		0.75		0.80

MODEL			RAS-4WH(V)NPE	RAS-5WH(V)NPE	RAS-6WH(V)NPE
Air heat exchanger	Type		Multi-pass Cross finned tube		
	Pipe material		Copper		
	Outer diameter	mm	7		
	Rows		2		
	Number of tubes in the heat exchanger		132		
	Fin material		Aluminium		
	Fin pitch		1.4		
	Maximum operating pressure	MPa	4.15		
	Total front area	m^2	1.35		
	Number of heat exchanger per unit		1		
Fan	Fan type		Direct drive propeller fan		
	Fans per unit		2		
	Outer diameter	mm	544		
	Revolutions	rpm	459/376	516/422	573/469
	Nominal air flow	m^3/min	80	90	100
Motor	Shell		Drip-proof type enclosure		
	Starting		Direct current control		
	Power	W	100 + 100		
	Quantity		2		
	Insulation class		E		
Compressor	Model		E402HHD-36A2 (1~) / E402HHD-36D2 (3N~)		
	Oil type		FVC68D		
	Quantity		0.90		

MODEL			RAS-8WHNPE	RAS-10WHNPE
Air heat exchanger	Type		Multi-pass cross-finned tube	
	Pipe material		Copper	
	Outer diameter	mm	7	
	Rows		3	
	Number of tubes in the heat exchanger		198	
	Fin material		Aluminium	
	Fin pitch		1.4	
	Maximum Heat exchanger pressure	MPa	4.15	
	Total front area	m^2	1.35	
	Number of evaporators per unit		1	
Fan	Fan type		Direct drive propeller fan	
	Fans per unit		2	
	Outer diameter	mm	544	
	Revolutions	rpm	586/717	644/787
	Nominal air flow	m^3/min	127	134
Motor	Shell		Drip-proof type enclosure	
	Starting		Direct current control	
	Power	W	138 + 138	
	Quantity		2	
	Insulation class		E	
Compressor	Model		DA50PHD-D1SE2	DA65PHD-D1SE2
	Oil type		FVC68D	
	Quantity		1.90	

3.4.2 Split system - Indoor unit

3.4.2.1 YUTAKI S

Model				RWM-2.0NE(-W)	RWM-2.5NE(-W)	RWM-3.0NE(-W)	RWM-4.0NE(-W)	RWM-5.0NE(-W)	RWM-6.0NE(-W)	RWM-8.0NE(-W)	RWM-10.0NE(-W)
Water heat exchanger	Type		-	Brazed plate							
	Material		-	Stainless steel							
	Transfer fluids		-	R410A - H_2O							
	Quantity		-	1							
	Internal refrigerant volume		L	0.54	0.73	0.81	1.55	2.09	2.09	3.19	3.91
	Internal water volume		L	0.57	0.76	0.84	1.64	2.18	2.18	3.28	4.00
	Insulation material		-	NBR + PVC							
Water pump	Model		-	Yonos PARA RS15/7.0			Yonos PARA RS15/7.5			UPML GEO 25-105	
	Type		-	Inverter							
	Control		-	PWM							
	Power supply		-	1~ 230V 50Hz							
	Maximum lift pressure		kPa	7.2			7.6			10.5	
	Maximum water flow		m^3/h	3.3			4.0			5.5	
	Maximum power input		W	45			75			140	
	Piping	Water inlet	(inches)	G 1”			G 1”			G 1-1/2”	
		Water outlet	(inches)	G 1”			G 1”			G 1-1/2”	
		Inlet/outlet distance	mm	130			130			180	
Water electric heater	Material		-	Stainless steel (Immersion heating element)							
	Power supply		-	1~ 230V 50Hz			1~ 230V 50Hz 3N~ 400V 50Hz			3N~ 400V 50Hz	
	Maximum electric heater power		kW	3.0			6.0			9.0	
	Regulated electric heater power (step 1/ step 2/ step 3)		kW	1.0/2.0/3.0			2.0/4.0/6.0			3.0/6.0/9.0	
	Thermostat security			Yes (Cut-out: 90 ºC)							
Expansion vessel	Material		-	Steel (with stainless/galvanized steel connections)							
	Internal water volume		L	6.0						10.0	
	Working pressure		MPa	0.3							
	Pre-loading pressure (Air side)		MPa	0.1							
Water strainer	Type		-	Isolated water strainer (Filter ball)							
	Material		-	Brass							
	Piping connection		(inches)	1”, DN25						1”, DN32	
	Mesh (hole size)		mm	0.7							
	Self-cleaning (with back flush) filter		-	Yes							
Safety valve			-	Yes (3 bar)							
Low pressure switch			-	Yes (<0.5 bar)							
Shut-off valve			-	Yes (2 factory-supplied valves)							
Air purger			-	Yes							
Manometer			-	Yes							
Unit controller			-	Yes (PC-ARFHE)							

3.4.2.2 YUTAKI S COMBI

◆ Standard model and UK market model

Model				RWD-2.0NWE-(200/260)S(-K)(-W)	RWD-2.5NWE-(200/260)S(-K)(-W)	RWD-3.0NWE-(200/260)S(-K)(-W)	RWD-4.0NWE-(200/260)S(-K)(-W)	RWD-5.0NWE-(200/260)S(-K)(-W)	RWD-6.0NWE-(200/260)S(-K)(-W)
Domestic hot water tank	Casing material			Stainless steel					
	Tank	Nominal water volume	L	RWD-NWE-200S(-K): 200 L RWD-NWE-260S(-K): 260 L					
		Net water volume	L	RWD-NWE-200S(-K): 190L RWD-NWE-260S(-K): 250L					
		Material	-	DUPLEX (Standard) / AISI 444 (Uk market model)					
		Max. water temperature	°C	75					
		Max. water pressure	bar	10					
		Max. heating coil water temperature	°C	75					
		Max. heating coil water pressure	bar	3					
	Tank insulation	Material	-	NEOPOR					
		Thickness	mm	50					
	Heat exchanger	Quantity	-	1					
		Coil surface area	m^2	1.60					
		Internal coil volume	L	20.37					
	Tank's heater	Quantity	-	1					
		Type	-	Immersion heater type					
		Heater rating	kW	2.7					
	Mechanical thermostat (adjustable and security)		-	Yes (adjustable 28~80ºC ; cut-out: 90ºC)					
Water heat exchanger	Type		-	Brazed plate					
	Material		-	Stainless steel					
	Transfer fluids		-	R410A - H_2O					
	Quantity		-	1					
	Internal refrigerant volume		L	0.54	0.73	0.81	1.55	2.09	2.09
	Internal water volume		L	0.57	0.76	0.84	1.64	2.18	2.18
	Insulation material		-	NBR + PVC					
Water pump	Model		-	Yonos PARA RS15/7.0			Yonos PARA RS15/7.5		
	Type		-	Inverter					
	Control		-	PWM					
	Power supply		-	1~ 230V 50Hz					
	Maximum lift pressure		kPa	7.2			7.6		
	Maximum water flow		m^3/h	3.3			4.0		
	Maximum power input		W	45			75		
	Piping	Water inlet	(in.)	G 1"			G 1"		
		Water outlet	(in.)	G 1"			G 1"		
		Inlet/outlet distance	mm	130			130		
Water electric heater	Material		-	Stainless steel (Immersion heating element)					
	Power supply		-	1~ 230V 50Hz			1~ 230V 50Hz / 3N~ 400V 50Hz		
	Maximum electric heater power		kW	3.0			6.0		
	Regulated electric heater power (step 1/ step 2/ step 3)		kW	1.0/2.0/3.0			2.0/4.0/6.0		
	Thermostat security		-	Yes (Cut-out: 90 ºC)					

Model			RWD-2.0NWE-(200/260)S(-K)(-W)	RWD-2.5NWE-(200/260)S(-K)(-W)	RWD-3.0NWE-(200/260)S(-K)(-W)	RWD-4.0NWE-(200/260)S(-K)(-W)	RWD-5.0NWE-(200/260)S(-K)(-W)	RWD-6.0NWE-(200/260)S(-K)(-W)
Expansion vessel	Material	-	Steel (with stainless/galvanized steel connections)					
	Internal water volume	L	6.0					
	Working pressure	MPa	0.3					
	Pre-loading pressure (Air side)	MPa	0.1					
Water strainer	Type	-	Isolated water strainer (Filter ball)					
	Material	-	Brass					
	Piping connection	(in.)	1”, DN25			1”, DN32		
	Mesh (hole size)	mm	0.7					
	Self-cleaning (with back flush) filter	-	Yes					
DHWT Pressure and temperature relief valve (1)		bar	7					
		ºC	96					
DHWT thermostat (1)		ºC	85					
Safety valve		-	Yes (3 bar)					
Low pressure switch		-	Yes (<0.5 bar)					
Unit drain valve		-	Yes					
DHW drain valve		-	Yes					
Shut-off valve		-	Yes (2 factory-supplied valves)					
Air purger		-	Yes					
Manometer		-	Yes					
Unit controller		-	Yes (PC-ARFHE)					

(1) Only for UK version.

◆ Model for solar combination

Model				RWD-2.0NW(S) E-260S(-W)	RWD-2.5NW(S) E-260S(-W)	RWD-3.0NW(S) E-260S(-W)	RWD-4.0NW(S) E-260S(-W)	RWD-5.0NW(S) E-260S(-W)	RWD-6.0NW(S) E-260S(-W)
Domestic hot water tank	Casing material			Stainless steel					
	Tank	Nominal water volume	L	RWD-NWE-200S: 200 L RWD-NWE-260S: 260 L					
		Net water volume	L	RWD-NWE-200S: 190L RWD-NWE-260S: 250L					
		Material	-	AISI 444					
		Max. water temperature	°C	75					
		Max. water pressure	bar	10					
		Max. heating coil water temperature	°C	75					
		Max. heating coil water pressure	bar	3					
	Tank insulation	Material	-	NEOPOR					
		Thickness	mm	50					
	Heat exchanger (Heating coil)	Quantity	-	1					
		Coil surface area	m^2	1.60					
		Internal coil volume	L	20.37					
	Heat exchanger (Solar coil)	Quantity	-	1					
		Coil surface area	m^2	0.37					
		Internal coil volume	L	7.90					
	Tank's heater	Quantity	-	1					
		Type	-	Immersion heater type					
		Heater rating	kW	2.7					
	Mechanical thermostat (adjustable and security)		-	Yes (adjustable 28~80ºC ; cut-out: 90ºC)					
Water heat exchanger	Type		-	Brazed plate					
	Material		-	Stainless steel					
	Transfer fluids		-	R410A - H_2O					
	Quantity		-	1					
	Internal refrigerant volume		L	0.54	0.73	0.81	1.55	2.09	2.09
	Internal water volume		L	0.57	0.76	0.84	1.64	2.18	2.18
	Insulation material		-	NBR + PVC					
Water pump	Model		-	Yonos PARA RS15/7.0			Yonos PARA RS15/7.5		
	Type		-	Inverter					
	Control		-	PWM					
	Power supply		-	1~ 230V 50Hz					
	Maximum lift pressure		kPa	7.2			7.6		
	Maximum water flow		m^3/h	3.3			4.0		
	Maximum power input		W	45			75		
	Piping	Water inlet	(in.)	G 1"			G 1"		
		Water outlet	(in.)	G 1"			G 1"		
		Inlet/outlet distance	mm	130			130		
Water electric heater	Material		-	Stainless steel (Immersion heating element)					
	Power supply		-	1~ 230V 50Hz			1~ 230V 50Hz / 3N~ 400V 50Hz		
	Maximum electric heater power		kW	3.0			6.0		
	Regulated electric heater power (step 1/ step 2/ step 3)		kW	1.0/2.0/3.0			2.0/4.0/6.0		
	Thermostat security		-	Yes (Cut-out: 90 ºC)					

Model			RWD-2.0NW(S) E-260S(-W)	RWD-2.5NW(S) E-260S(-W)	RWD-3.0NW(S) E-260S(-W)	RWD-4.0NW(S) E-260S(-W)	RWD-5.0NW(S) E-260S(-W)	RWD-6.0NW(S) E-260S(-W)
Expansion vessel	Material	-	Steel (with stainless/galvanized steel connections)					
	Internal water volume	L	6.0					
	Working pressure	MPa	0.3					
	Pre-loading pressure (Air side)	MPa	0.1					
Water strainer	Type	-	Isolated water strainer (Filter ball)					
	Material	-	Brass					
	Piping connection	(in.)	1”, DN25			1”, DN32		
	Mesh (hole size)	mm	0.7					
	Self-cleaning (with back flush) filter	-	Yes					
Safety valve		-	Yes (3 bar)					
Low pressure switch		-	Yes (<0.5 bar)					
Unit drain valve		-	Yes					
DHW drain valve		-	Yes					
Shut-off valve		-	Yes (2 factory-supplied valves)					
Air purger		-	Yes					
Manometer		-	Yes					
Unit controller		-	Yes (PC-ARFHE)					

3.4.2.3 YUTAKI S80

Model				RWH-4.0(V)NF(W)E			RWH-5.0(V)NF(W)E			RWH-6.0(V)NF(W)E		
Compressor	Model	1~ 230V 50Hz	-	H405DHD-64A1			H405DHD-64A1			H405DHD-64A1		
		3N~ 400V 50Hz	-	H405DHD-64D1			H405DHD-64D1			H405DHD-64D1		
	Type		-	Scroll DC Inverter driven								
	Pressure resistance	Discharge	MPa	2.94								
		Suction	MPa	0.15								
	Motor type	Starting method	-	Inverter-driven (I.D.)								
		Poles	-	4								
		Insulation class	-	E								
	Oil type		-	FVC68D								
	Oil quantity		L	1.2								
Water heat exchanger	Type		-	Brazed plate								
	Material		-	Stainless steel								
	Transfer fluids		-	R410A - H_2O	R134a - H_2O	R410A - R134a	R410A - H_2O	R134a - H_2O	R410A - R134a	R410A - H_2O	R134a - H_2O	R410A - R134a
	Quantity		-	1	1	1	1	1	1	1	1	1
	Internal refrigerant volume		L	1.55	1.55	2.09	2.09	2.09	2.09	2.09	2.09	2.09
	Internal water volume		L	1.64	1.64	2.18	2.18	2.18	2.18	2.18	2.18	2.18
	Insulation material		-	NBR + PVC								
Water pump	Model		-	Yonos PARA RS15/7.5								
	Type		-	Inverter								
	Control		-	PWM								
	Power supply		-	1~ 230V 50Hz								
	Maximum lift pressure		kPa	7.6								
	Maximum water flow		m^3/h	4.0								
	Maximum power input		W	75								
	Piping	Water inlet	(in.)	G 1”								
		Water outlet	(in.)	G 1”								
		Inlet/outlet distance	mm	130								
Expansion vessel	Material		-	Steel (with stainless/galvanized steel connections)								
	Internal water volume		L	12.0								
	Working pressure		MPa	0.3								
	Pre-loading pressure (Air side)		MPa	0.1								
Water strainer	Type		-	Isolated water strainer (Filter ball)								
	Material		-	Brass								
	Piping connection		(in.)	1”, DN32								
	Mesh (hole size)		mm	0.7								
	Self-cleaning (with back flush) filter		-	Yes								
Safety valve			-	Yes (3 bar)								
Unit drain valve			-	Yes								
Shut-off valve			-	Yes (2 factory-supplied valves)								
Air purger			-	Yes								
Manometer			-	Yes								
Unit controller			-	No, available as Accessory								

3.4.3 Monobloc system - YUTAKI M

Model				RASM-3VNE	RASM-4(V)NE	RASM-5(V)NE	RASM-6(V)NE
Compressor	Model	1~ 230V 50Hz	-	2YC45KXD	E402HHD-36A2		
		3N~ 400V 50Hz	-	-	E402HHD-36D2		
	Type		-	Rotary DC Inverter driven	Scroll DC Inverter driven		
	Pressure resistance	Discharge	MPa	4.15			
		Suction	MPa	2.21			
	Motor type	Starting method	-	Direct current control			
		Poles	-	4			
		Insulation class	-	E			
	Oil type		-	FVC50K	FVC68D		
	Oil quantity		L	0.80	0.90		
Air heat exchanger	Type		-	Multi-pass cross-finned tube			
	Pipe material		-	Copper			
	Outer diameter		mm	8	7		
	Rows		-	2			
	Number of tubes in the heat exchanger		-	44	132		
	Fin material		-	Aluminium			
	Fin pitch		mm	1.4			
	Maximum operating pressure		MPa	4.15			
	Total front area		m^2	0.47	1.35		
	Number of heat exchanger per unit		-	1			
Fan	Fan type		-	Direct drive propeller fan			
	Fans per unit		-	1	2		
	Outer diameter		mm	449	544		
	Revolutions		rpm	850	459/376	516/422	573/469
	Nominal air flow		m^3/min	45	80	90	100
Motor	Type		-	Drip-proof type enclosure			
	Starting method		-	Direct current control			
	Power		W	40	100 + 100		
	Quantity		-	1	2		
	Insulation class		-	E			
Water heat exchanger	Type		-	Brazed plate			
	Material		-	Stainless steel			
	Transfer fluids		-	R410A - H_2O			
	Quantity		-	1			
	Internal refrigerant volume		L	0.81	1.55	2.09	2.09
	Internal water volume		L	0.84	1.64	2.18	2.18
	Insulation material		-	NBR + PVC			
Water pump	Model		-	Yonos PARA RS15/7.0	Yonos PARA RS15/7.5		
	Type		-	Inverter			
	Control		-	PWM			
	Power supply		-	1~ 230V 50Hz			
	Maximum lift pressure		kPa	7.2	7.6		
	Maximum water flow		m^3/h	3.3	4.0		
	Maximum power input		W	45	75		
	Piping	Water inlet	(in.)	G 1”			
		Water outlet	(in.)	G 1”			
		Inlet/outlet distance	mm	130			

Model			RASM-3VNE	RASM-4(V)NE	RASM-5(V)NE	RASM-6(V)NE
Expansion vessel	Material	-	Stainless steel (Immersion heating element)			
	Internal water volume	L	6.0			
	Working pressure	MPa	0.3			
	Pre-loading pressure (Air side)	MPa	0.1			
Water strainer	Type	-	Isolated water strainer (Filter ball)			
	Material	-	Brass			
	Piping connection	(in.)	1”, DN25			
	Mesh (hole size)	mm	0.7			
	Self-cleaning (with back flush) filter	-	Yes			
Safety valve		-	Yes (3 bar)			
Shut-off valve		-	No. Field supplied accessory.			
Air purger		-	Yes			
Manometer		-	Yes			
Unit controller		-	No, Supplied as accessory			

3.5 Electrical data

3.5.1 Considerations

Keywords:

- U: Power supply.
- PH: Phase.
- IPT: Total input power.
- STC: Starting current: Less than maximum current.
- RNC: Running current.
- MC: Maximum current.

NOTE

- *Heating conditions: Inlet/outlet water temperature: 30/35 ºC; Outdoor ambient temperature (DB/WB): 7/6 ºC.*
- *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** "10.3 Electrical connection" **chapter.***

3.5.2 Split system - Outdoor unit

RAS-(2-10)WH(V)NP(E) in combination with YUTAKI S, YUTAKI S COMBI

Model	Power supply	Applicable voltage		Compressor and fan motors					MC (A)	Max. IPT (kW)
					Cooling		Heating			
		U max. (V)	U min. (V)	STC (A)	RNC (A)	IPT (KW)	RNC (A)	IPT (KW)		
RAS-2WHVNP	1~ 230V 50Hz	253	207	-	5.2	1.17	3.4	0.77	14	3.14
RAS-2.5WHVNP					6.8	1.54	5.3	1.21	16	3.59
RAS-3WHVNP					9.4	2.14	7.0	1.60	18	4.05
RAS-4WHVNPE					9.2	2.11	9.3	2.12	30	6.93
RAS-5WHVNPE					12.6	2.87	12.7	2.90	30	6.93
RAS-6WHVNPE					16.0	3.65	15.0	3.43	30	6.93
RAS-4WHNPE	3N~ 400V 50Hz	440	360		3.4	2.11	3.4	2.12	14	8.70
RAS-5WHNPE					4.6	2.87	4.6	2.90	14	8.70
RAS-6WHNPE					5.8	3.65	5.5	3.43	16	9.95
RAS-8WHNPE					7.1	4.41	7.3	4.58	24	15.00
RAS-10WHNPE					9.8	6.15	8.8	5.51	24	15.00

RAS-(4-6)WH(V)NP(E) in combination with YUTAKI S 80

Model	Power supply	Applicable voltage		Compressor and fan motors					MC (A)	Max. IPT (kW)
					Cooling		Heating			
		U max. (V)	U min. (V)	STC (A)	RNC (A)	IPT (KW)	RNC (A)	IPT (KW)		
RAS-4WHVNPE	1~ 230V 50Hz	253	207	-	9.2	2.11	9.3	2.12	20	6.93
RAS-5WHVNPE					12.6	2.87	12.7	2.90	25	6.93
RAS-6WHVNPE					16.0	3.65	15.0	3.43	25	6.93
RAS-4WHNPE	3N~ 400V 50Hz	440	360		3.4	2.11	3.4	2.12	14	8.70
RAS-5WHNPE					4.6	2.87	4.6	2.90	14	8.70
RAS-6WHNPE					5.8	3.65	5.5	3.43	16	9.95

3.5.3 Split system - Indoor unit

3.5.3.1 YUTAKI S

RWM-(2.0-10.0)NE(-W)

Model	Power supply	Applicable voltage		Operation mode	RNC (A)	IPT (kW)	MC (A)	Max. IPT (kW)
		U max. (V)	U min. (V)					
RWM-(2.0-3.0) NE(-W)	1~ 230V 50Hz	253	207	Without electric heater	0.2	0.05	0.2	0.05
				With electric heater	13.2	3.05	14.5	3.05
				With DHW tank heater	13.2	3.05	14.5	3.05
				With electric and DHW tank heaters	26.3	6.05	28.9	6.05
RWM-(4.0-6.0) NE(-W)	1~ 230V 50Hz	253	207	Without electric heater	0.3	0.08	0.3	0.08
				With electric heater	26.4	6.08	29.0	6.08
				With DHW tank heater	13.4	3.08	14.7	3.08
				With electric and DHW tank heaters	39.5	9.08	43.4	9.08
	3N~ 400V 50Hz	440	360	Without electric heater	0.3	0.08	0.3	0.08
				With electric heater	8.8	6.08	9.9	6.08
				With DHW tank heater	4.4	3.08	14.7	3.08
				With electric and DHW tank heaters	13.1	9.08	24.2	9.08
RWM-(8.0/10.0) NE(-W)	3N~ 400V 50Hz	440	360	Without electric heater	0.3	0.08	0.6	0.14
				With electric heater	13.1	9.08	14.9	9.14
				With DHW tank heater	4.4	3.08	15.0	3.14
				With electric and DHW tank heaters	17.4	12.08	29.2	12.14

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".

3.5.3.2 YUTAKI S COMBI

RWD-(2.0-6.0)NW(S)E-(200/260)S(-K)(-W)

Model	Power supply	Applicable voltage		Operation mode	RNC (A)	IPT (kW)	MC (A)	Max. IPT (kW)
		U max. (V)	U min. (V)					
RWD-(2.0-3.0NW(S)E-(200/260)S(-K)(-W)	1~ 230V 50Hz	253	207	Without electric heater	0.2	0.05	0.2	0.05
				With electric heater	13.2	3.05	14.5	3.05
				With DHW tank heater	12.2	2.80	12.7	2.80
				With electric and DHW tank heaters	25.2	5.80	27.0	5.80
RWD-(4.0-6.0)NW(S)E-(200/260)S(-W)	1~ 230V 50Hz	253	207	Without electric heater	0.3	0.08	0.3	0.08
				With electric heater	26.4	6.08	29.0	6.08
				With DHW tank heater	12.3	2.83	12.8	2.83
				With electric and DHW tank heaters	38.4	8.83	41.5	8.83
	3N~ 400V 50Hz	440	360	Without electric heater	0.3	0.08	0.3	0.08
				With electric heater	8.8	6.08	9.9	6.08
				With DHW tank heater	4.1	2.83	12.8	2.83
				With electric and DHW tank heaters	12.7	8.83	22.4	8.83

3.5.3.3 YUTAKI S80

◆ Version for indoor unit alone

RWH-(4.0-6.0)(V)NFE

Model	Power supply	Applicable voltage		Operation mode	RNC (A)	IPT (kW)	MC (A)	Max. IPT (kW)
		U max. (V)	U min. (V)					
RWH-4.0VNFE	1~ 230V 50Hz	253	207	Without simultaneous operation of electric heater in DHW tank	12.1	2.73	24	5.33
				With simultaneous operation of electric heater in DHW tank	25.4	5.73	38	8.33
RWH-5.0VNFE				Without simultaneous operation of electric heater in DHW tank	12.3	2.78	28	6.23
				With simultaneous operation of electric heater in DHW tank	25.6	5.78	42	9.23
RWH-6.0VNFE				Without simultaneous operation of electric heater in DHW tank	14.3	3.23	31	6.91
				With simultaneous operation of electric heater in DHW tank	27.6	6.23	45	9.91
RWH-4.0NFE	3N~ 400V 50Hz	440	360	Without simultaneous operation of electric heater in DHW tank	5.6	2.73	10	4.68
				With simultaneous operation of electric heater in DHW tank	11.8	5.73	24	7.68
RWH-5.0NFE				Without simultaneous operation of electric heater in DHW tank	5.7	2.78	10	4.68
				With simultaneous operation of electric heater in DHW tank	11.9	5.78	24	7.68
RWH-6.0NFE				Without simultaneous operation of electric heater in DHW tank	6.7	3.23	10	4.68
				With simultaneous operation of electric heater in DHW tank	12.8	6.23	24	7.68

NOTE

The data corresponding to DHW tank heater is calculated in combination with the YUTAKI S80 domestic hot water tank accessory "DHWT-(200/300)S-3.0H2E".

◆ Version for combination with DHW tank

RWH-(4.0-6.0)(V)NFWE + DHWS(200/260)S-2.7H2E(-W)

Model	Power supply	Applicable voltage		Operation mode	RNC (A)	IPT (kW)	MC (A)	Max. IPT (kW)
		U max. (V)	U min. (V)					
RWH-4.0VNFWE	1~ 230V 50Hz	253	207	Without simultaneous operation of electric heater in DHW tank	12.1	2.73	24	5.33
				With simultaneous operation of electric heater in DHW tank	24.3	5.48	36	7.94
RWH-5.0VNFWE				Without simultaneous operation of electric heater in DHW tank	12.3	2.78	28	6.23
				With simultaneous operation of electric heater in DHW tank	24.5	5.53	40	8.84
RWH-6.0VNFWE				Without simultaneous operation of electric heater in DHW tank	14.3	3.23	31	6.91
				With simultaneous operation of electric heater in DHW tank	26.5	5.98	43	9.52
RWH-4.0NFWE	3N~ 400V 50Hz	440	360	Without simultaneous operation of electric heater in DHW tank	5.6	2.73	10	4.68
				With simultaneous operation of electric heater in DHW tank	11.3	5.48	22	7.30
RWH-5.0NFWE				Without simultaneous operation of electric heater in DHW tank	5.7	2.78	10	4.68
				With simultaneous operation of electric heater in DHW tank	11.4	5.53	22	7.30
RWH-6.0NFWE				Without simultaneous operation of electric heater in DHW tank	6.7	3.23	10	4.68
				With simultaneous operation of electric heater in DHW tank	12.3	5.98	22	7.30

NOTE

The data corresponding to DHW tank heater is calculated in combination with the YUTAKI S80 domestic hot water tank accessory "DHWS(200/260)S-2.7H2E(-W)".

◆ Domestic hot water tank

DHWS(200/260)S-2.7H2E(-W)

Model	Power supply	Applicable voltage		RNC (A)	IPT (kW)	MC (A)	Max. IPT (kW)
		U max. (V)	U min. (V)				
DHWS200S-2.7H2E(-W)	1~ 230V 50Hz	253	207	12.0	2.75	13.2	2.75
DHWS260S-2.7H2E(-W)				12.0	2.75	13.2	2.75

3.5.4 Monobloc system - YUTAKI M

RASM-(3-6)(V)NE

Model	Power supply	Applicable voltage		Operation mode	Compressor and fan motors						MC (A)	Max. IPT (kW)
		U max. (V)	U min. (V)		PH	STC (A)	Heating operation		Cooling operation			
							RNC (A)	IPT (KW)	RNC (A)	IPT (KW)		
RASM-3VNE	1~ 230V 50Hz	253	207	Without DHW tank heater	1~	-	7.2	1.65	9.6	2.18	21.6	4.93
				With DHW tank heater			19.2	4.40	9.5	2.18	34.1	7.80
RASM-4VNE				Without DHW tank heater			9.7	2.20	9.6	2.18	30.8	7.01
				With DHW tank heater			21.7	4.95	9.6	2.18	43.3	9.88
RASM-5VNE				Without DHW tank heater			13.1	2.97	13.0	2.95	30.8	7.01
				With DHW tank heater			25.1	5.72	12.9	2.95	43.3	9.88
RASM-6VNE				Without DHW tank heater			15.4	3.50	16.4	3.72	30.8	7.01
				With DHW tank heater			27.4	6.25	16.3	3.72	43.3	9.88
RASM-4NE	3N~ 400V 50Hz	440	360	Without DHW tank heater	3N~		3.6	2.20	3.6	2.18	14.3	8.77
				With DHW tank heater			11.4	4.95	5.0	2.18	26.8	11.65
RASM-5NE				Without DHW tank heater			4.8	2.97	4.8	2.95	14.3	8.77
				With DHW tank heater			13.2	5.72	6.8	2.95	26.8	11.65
RASM-6NE				Without DHW tank heater			4.8	2.97	4.8	2.95	16.3	10.02
				With DHW tank heater			12.8	5.72	6.6	2.95	28.8	12.90

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".

3.5.5 Complementary system - YUTAKI CASCADE CONTROLLER

Model	Main unit power			Applicable voltage		MC [A]
	U [V]	PH	F [Hz]	U max [V]	U min [V]	
ATW-YCC-(01/02) (with DHW E.Heater)	230	1~	50	253	207	16
ATW-YCC-(01/02) (only EBOX)	230	1~	50	253	207	5

4. Capacity and selection data

Index

4.1 System selection procedure 106
4.1.1 Selection parameters 106
4.1.2 Selection procedure 106
4.1.2.1 Description of procedure for YUTAKI S 108
4.1.2.2 Description of procedure for YUTAKI S COMBI 113
4.1.2.3 Description of procedure for YUTAKI S80 120
4.1.2.4 Selection procedure for YUTAKI M units 127
4.1.3 Flow rate and pressure drop check 133
4.2 System selection procedure (by Selection Software) 134
4.2.1 Introduction 134
4.2.2 How to use the Selection Software 134
4.3 YUTAKI S 153
4.3.1 Maximum heating capacity table (kW) (Integrated) 153
4.3.2 Maximum cooling capacity table (kW) 155
4.4 YUTAKI S COMBI 156
4.4.1 Maximum heating capacity table (kW) (Integrated) 156
4.4.2 Maximum cooling capacity table (kW) 158
4.5 YUTAKI S 80 159
4.5.1 Maximum heating capacity table (kW) (Integrated) 159
4.6 YUTAKI M 160
4.6.1 Maximum heating capacity table (kW) (Integrated) 160
4.6.2 Maximum cooling capacity table (kW) 161
4.7 Correction factors 162
4.7.1 Piping length correction factor 162
4.7.2 Correction factor owing to use of glycol (only for YUTAKI M) 165

4.1 System selection procedure

The following procedure is an example of selection of YUTAKI system based on previously defined installation requirements: required heating and cooling load, operating temperatures and special characteristics of the installation (energy system used, power source, etc.).

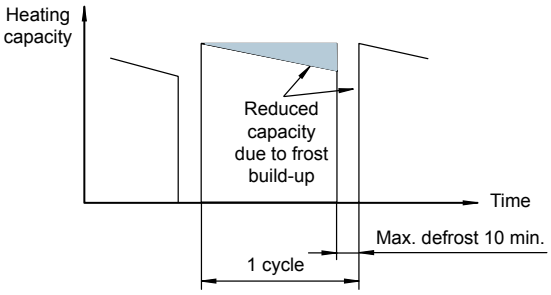
4.1.1 Selection parameters

The tables and graphs shown in this catalogue introduce several parameters used for the selection of YUTAKI units, which are summarised in the following list:

Available models	*Maximum capacity in heating (and in cooling, as an option)*
General information of the units	*COP and EER*
Operation space possibilities	*Different correction factors*
Working range	*Sound data for the different units*
Available energy systems	

NOTE

- *There is a defrost factor included in the Maximum heating capacity tables, as a correction of capacity data for each temperature. Additional calculation due to defrost is not necessary.*
- *The defrost correction factor corresponds to a relative humidity of 85%. If the condition changes, the correction factor will be different.*
- *The defrost correction factor is not valid for special conditions such as during snowfall or operation in a transitional period*



4.1.2 Selection procedure

The system selection procedure is as follows:

A split system with a combination of outdoor unit + indoor unit or a monobloc is preselected first, according to the heating design conditions. Then, the theoretical capacity values taken from the maximum capacity tables are corrected by means of the correction factors, resulting in the actual capacity used to select the system for heating operation.

Next, a suitable DHW tank (200/260 litres) is selected for the production of hot sanitary water, depending on the daily water needs (mandatory for YUTAKI S COMBI, optional as an accessory for YUTAKI S80). Finally, the preselected system combination for heating operation is checked for cooling operation in those models adapted for cooling operation (available as an option for YUTAKI S, YUTAKI S COMBI and YUTAKI M).

The system selection procedure is divided in two parts (heating and cooling) in those models adapted for cooling operation.

◆ Heating mode

Installation configurations

The YUTAKI units are designed to work in monovalent, monoenergetic or bivalent heating systems. They provide efficient control with a reduced energy consumption, while maintaining comfort in the building.

The functionality of a YUTAKI unit depends on the installed components and the selected configuration. It can be configured and upgraded to meet many installation requirements.

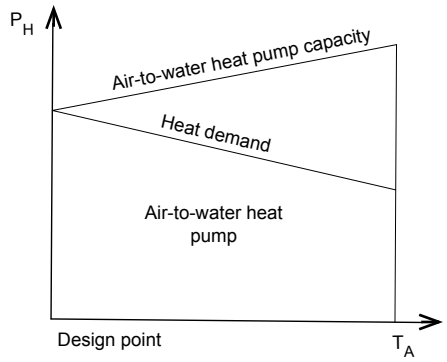
A brief description of the three main types of configuration is shown on the next page. These are taken into account in the selection process, in order to provide the best solution for the heating requirements.

Before proceeding to any selection calculation, it must be established whether the designed system is of monovalent, monoenergy or alternating bivalent (boiler only or heater+boiler) type. The capacity-time charts for these main energy systems are shown next.

Monovalent system

The YUTAKI unit is sized to provide 100% of the heating requirements on the coldest days of the year.

Example of monovalent system



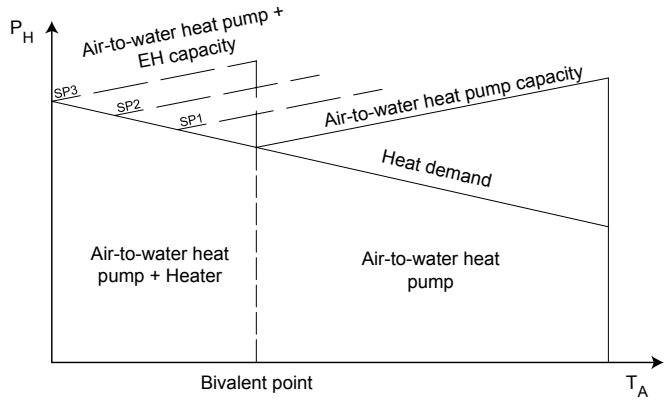
NOTE

- *T_A: Outdoor ambient temperature*
- *P_H: Heating capacity*

Monoenergy system

The YUTAKI unit is sized to provide approximately 80% of the heating requirements on the coldest days of the year. An auxiliary electric heater (mounted on YUTAKI S and YUTAKI S COMBI) is used to provide the additional heating required on cold days.

Example of monoenergy system



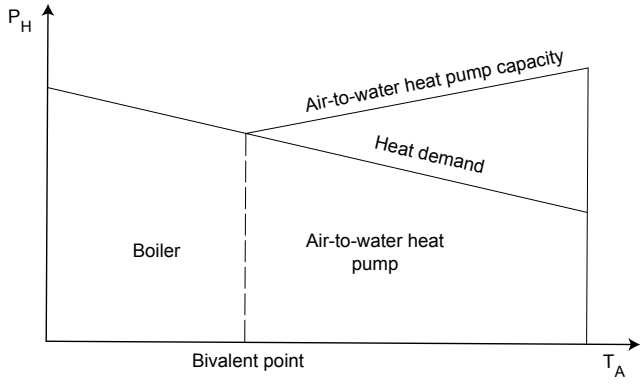
NOTE

- *T_A: Outdoor ambient temperature*
- *P_H: Heating capacity*
- *SP1/2/3: Heater steps*
- *Bivalent point can be set through the user interface of the controller.*

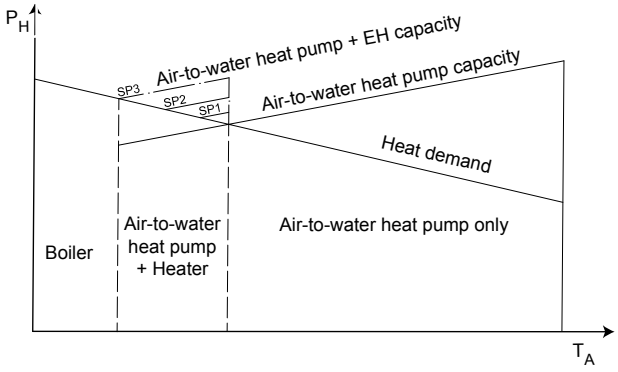
Alternating bivalent system

The boiler is configured to alternate operation with the air-to-water heat pump. A hydraulic separator or buffer tank has to be used to ensure hydraulic balancing.

Example of alternating bivalent system (Boiler only)



Example of alternating bivalent system (Heater + Boiler)



NOTE

- *T_A: Outdoor ambient temperature (°C)*
- *P_H: Heating capacity*
- *SP1/2/3: Heater steps*
- *Bivalent point can be set through the user interface of the controller.*

4.1.2.1 Description of procedure for YUTAKI S

The example described in this chapter is based on a monoenergy system, allowing the use of an electrical heater (to cover exceptional heating requirements on the coldest days of the year).

When there is already a conventional boiler (gas/oil) in the installation, it can be used for alternate operation with the YUTAKI S system (electric heater enabled or disabled). This helps to increase the overall performance of the whole installation significantly.

In any case, the calculation example can be applied to all the aforementioned energy systems.

Description of procedure

The selection procedure explained in this chapter is a simple example divided in 3 main blocks:

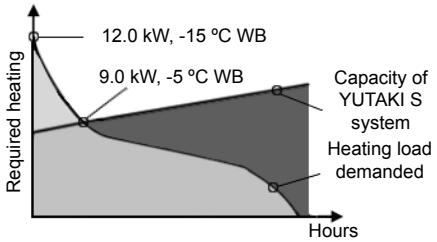
- Choice of the energy system to be used (monoenergy in this case), and selection of the YUTAKI S system depending on the required regular heating load.
- Check of the capacity of the selected combination of YUTAKI S and electric heater to cover the exceptional needs of the coldest days of the year.
- Selection of the Domestic Hot Water Tank accessory.

a) Selection for a required regular heating load

- **Step 1: Initial preselection**

Proposed energy system	Monoenergy
Inlet/outlet water temperature	30/35 ºC
Regular ambient temperature WB/DB (RH = 85%)	-7/-6 °C
Required regular heating load	9.0 kW
Ambient temperature WB/DB on the coldest day of the year (HR = 85%)	-15/-14.5 ºC
Heating load required on the coldest day of the year	12.0 kW

Installation restrictions	
Installation type	Radiant floor
Power supply	1~ 230V 50Hz
Height difference of indoor unit with respect to outdoor unit	15 m lower
Equivalent piping length between outdoor and indoor unit	20 m



These conditions determine the position in the Maximum heating capacity tables (See section *"4.3.1 Maximum heating capacity table (kW) (Integrated)"*, where it can be confirmed whether the unit has enough heating capacity to cover the regular heating load required by the installation (9.0 kW for an inlet/outlet water temperature of 30/35 ºC and an ambient temperature of -7 ºC WB).

YUTAKI S system	Maximum heating capacity (kW)
RAS-2WHVNP + RWM-2.0NE(-W)	4.70
RAS-2.5WHVNP + RWM-2.5NE(-W)	5.70
RAS-3WHVNP + RWM-3.0NE(-W)	6.71
RAS-4WHVNPE + RWM-4.0NE(-W)	**10.62**
RAS-5WHVNPE + RWM-5.0NE(-W)	12.00
RAS-6WHVNPE + RWM-6.0NE(-W)	13.00

The YUTAKI S system that covers the heating requirements of the installation is the combination of RAS-4WHVNPE + RWM-4.0NE(-W). Therefore, this is the preselected YUTAKI S system.

NOTE

In case of working with an ambient temperature value not included in the Maximum heating capacity tables in the "4.3.1 Maximum heating capacity table (kW) (Integrated)" section (for example, -3 ºC), interpolation is required using the values above and below the ambient temperature.

4

- **Step 2: Correction of heating capacity for piping length**

The actual heating capacity of the preselected unit must be calculated applying the necessary correction factors:

$$Q_H = Q_{MH} \times f_{LH}$$

Q_H: Actual heating capacity (kW)
Q_{MH}: Maximum heating capacity (kW)
f_{LH}: Correction factor for heating piping length

The maximum heating capacity (Q_{MH}) of the RAS-4WHVNPE + RWM-4.0NE(-W) system is 10.62 kW.

- Calculation of f_{LH}:

Both the length of the refrigerant piping used and the height difference between the outdoor unit and the indoor unit directly affect the performance of the unit. This concept is quantified by means of the correction factor for piping length.

To determine this value, it is necessary to refer to section *"Heating piping length correction factor"*. In the example shown in this chapter (equivalent piping length of 20 metres, with the indoor unit placed 15 metres lower than the outdoor unit), the resulting piping length correction factor is **0.992**.

- Calculation of Q_H:

Once the correction factors to be applied have been determined, the formula for actual heating capacity of the RAS-4WHVNPE + RWM-4.0NE(-W) system can be applied:

$Q_H = 10.62\ kW \times 0.992 =$ **10.53 kW**

The preselection is valid, since this actual heating capacity is greater than the heating load required by the installation (9.0 kW).

NOTE

If the calculated actual heating capacity is lower than the required regular heating load, the calculation must be done again with the immediately higher unit. If there is no unit higher than the preselected one, some other system (such as combination with boiler) or the regular use of the electric heater should be considered.

b) Selection for the coldest days of the year (use of the auxiliary electric heater)

The previous calculation shows that the RAS-4WHVNPE + RWM-4.0NE(-W) system provides a heating capacity of 10.53kW (-7 ºC WB), which is greater than the regular heating load necessary of 9.0 kW, but does not reach the peak heating load of 12.0kW (-15 ºC WB) required for the coldest days of the year. In these cases, the electric heater can provide the auxiliary heating capacity to cover the peak heating load entirely.

The aim of this section is to check that the chosen energy system (Monoenergy) covers the exceptional heating requirements for the coldest days of the year.

- **Step 1: Initial preselection**

  As the ambient temperature is lowered to -15 ºC, the Maximum heating capacity tables must be consulted again to determine the maximum heating capacity that the RAS-4WHVNPE + RWM-4.0NE(-W) system can provide under these new conditions.

  The maximum heating capacity for an ambient temperature of -15 ºC WB and a water inlet/outlet temperature of 30/35 ºC is ***9.62 kW.***

- **Step 2: Heating capacity correction for piping length**

  The actual heating capacity of the selected system for the coldest days of the year is calculated by applying the correction factors for defrost and piping length, following the previously used method.

$$Q_H = Q_{MH} \times f_{LH}$$

Q_H: ***Actual heating capacity (kW)***
Q_{MH}: ***Maximum heating capacity (kW)***
f_{LH}: ***Heating piping length correction factor***

- Calculation of f_{LH}:

  The same correction factor as in the previous section ***(0.992).***

- Calculation of Q_H:

  Once the corresponding correction factors have been determined, the formula for actual heating capacity of the RAS-4WHVNPE + RWM-4.0NE(-W) system can be applied:

  Q_H= *9.62 kW x 0.992 =* ***9.54 kW***

- **Step 3: Calculation of the heating capacity for the combination (YUTAKI S system with electric heater)**

  Once the corresponding correction factors are applied, the actual heating capacity provided by the RAS-4WHVNPE + RWM-4.0NE(-W) system is 9.54 kW. This heating capacity does not cover the required heating load for the coldest days (12.0 kW).

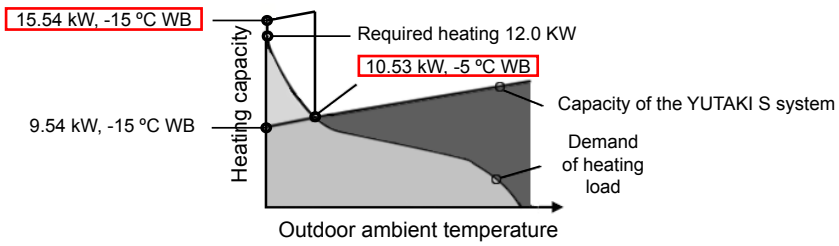
  In these cases, the electric heater is to provide the auxiliary capacity required to cover exceptional heating needs.

  The electric heater of the RWM-4.0NE(-W) unit provides a power of 6 kW, which must be added to the heating capacity provided by the preselected unit. The result is:

  Q_H= *9.54 kW + 6 kW =* ***15.54 kW***

  The heating capacity resulting from the addition of the supplementary heating capacity provided by the electric heater is higher than the heating demand of 12.0 kW estimated in this example for the coldest days of the year, so the preselection of the RAS-4WHVNPE + RWM-4.0NE(-W) system is considered valid.

  The resulting energy system resulting is as follows:



Three-step electric heater control

The heating capacity supplied by the electric heater can be more precisely adjusted by means of the three-step electric heater control. When the electric heater operates in steps 1 or 2, the power input is reduced in comparison with the total power input of the electric heater.

In this example, this option can be applied. The electric heater can operate in step 2 (4 kW), covering the required heating load for the coldest days with a reduction of power input. The result is:

Q_H= *9.54 kW + 4 kW =* ***13.54 kW***

c) Selection of the domestic hot water tank accessory

The domestic hot water tank accessory corresponding to the selected YUTAKI S system is either DHWT-200S-3.0H2E or DHWT-300S-3.0H2E, depending on the daily water demand and the combination method. The daily water demand is estimated with the following calculation formula for consumption:

$$D_i(T)= D_i(60\ ºC) \times (60-T_i / T-T_i)$$

Where:

D_i(T): ***Water demand at T temperature***

D_i(60ºC): ***Domestic hot water demand at 60 ºC***

T: ***Temperature of the domestic hot water tank***

T_I: ***Temperature of the inlet cold water***

- Calculation of ***D_i(60 ºC)***:

  The standard consumption, expressed in daily litres per person and determined by technical installation regulations of each country, is used to calculate the domestic hot water demand at 60 ºC***, D_i(60 ºC)***. This quantity is then multiplied by the expected number of users of the installation. In the following example, the domestic hot water demand at 60 ºC has been considered as 30 litres per person, in a detached house with 4 residents (3 bedrooms).

- Calculation of ***T***:

  The temperature of the domestic hot water tank refers to the temperature of the accumulated water inside the tank, prior to operation. This temperature is usually between 45 ºC and 65 ºC. It has been considered as 45 ºC in this example.

- Calculation of ***T_I***:

  The temperature of the inlet cold water refers to the temperature of the water being supplied to the tank. Since this temperature is usually between 10 ºC and 15 ºC, it has been considered as 12 ºC in this example.

- Example:

  $D_i(T)$= *120 x (60-12 / 45-12) =* ***174.6 litres/day***

  174.6 x 2(*) = ***349.2 litres/day*** *approximate demand of hot water*

NOTE

(*) It is recommended to multiply the calculated consumption by two, in case that the installation is in a detached house. This is done to ensure a steady supply of hot water. In the case of a multifamily installation, it is not necessary to increase the forecast of hot water demand, given the lower simultaneity factor.

Therefore, a 300 litre tank is recommended when the YUTAKI S system is a combination of RAS-4WHVNPE + RWM-4.0NE(-W) or higher, in order to ensure a longer supply of hot water and a better system performance. In case that the conditions of demand and the YUTAKI S system are lower than those specifications, a tank with a capacity between 200 litres and 300 litres can be selected, depending on the demand conditions.

A table with the selection of domestic hot water (DHW) tanks recommended by HITACHI for the different existing combinations is shown below:

YUTAKI S system	Domestic hot water tank
RAS-2WHVNP + RWM-2.0NE(-W)	DHWT-200S-3.0H2E DHWT-300S-3.0H2E
RAS-2.5WHVNP + RWM-2.5NE(-W)	
RAS-3WHVNP + RWM-3.0NE(-W)	
RAS-4WH(V)NPE + RWM-4.0NE(-W)	DHWT-300S-3.0H2E
RAS-5WH(V)NPE + RWM-5.0NE(-W)	
RAS-6WH(V)NPE + RWM-6.0NE(-W)	
RAS-8WHNPE + RWM-8.0NE(-W)	
RAS-10WHNPE + RWM-10.0NE(-W)	

NOTE

- *The YUTAKI S system is designed for combination with a HITACHI domestic hot water tank. In case that another tank is being used in combination with a YUTAKI S system, HITACHI cannot guarantee the correct operation or reliability of the system.*
- *This procedure for selection of a domestic hot water tank is merely illustrative; please refer to the applicable local regulations in order to ensure a proper water demand value.*

◆ Cooling mode (as an option, adding the cooling kit accessory and the setting for cooling mode)

Description of the procedure

Upon verification that the selected system is able to cover all the heating needs, it is necessary to perform the same check for cooling mode, in order to obtain the cooling capacity of the system.

- **Step 1: Initial preselection**

Inlet/outlet water temperature	23/18 ºC
Ambient temperature DB	30 °C
Required cooling load	14.5 kW

Installation restrictions	
Installation type	Refreshing floor

These conditions determine the position in the Maximum cooling capacity tables (See section *"4.3.2 Maximum cooling capacity table (kW)"*), where it can be confirmed whether the preselected unit for heating mode can provide the cooling load required by the installation (14.5 kW for an inlet/outlet water temperature of 23/18 ºC and an ambient temperature of 30 ºC DB).

YUTAKI S system	Maximum cooling capacity (kW)
RAS-4WHVNPE + RWM-4.0NE(-W)	15.1

As shown in the table, the RAS-4WHVNPE + RWM-4.0NE(-W) system provides a theoretical cooling capacity (15.1 kW) greater than the cooling load required by the installation (14.5 kW). Therefore, the calculation process can continue.

NOTE

If the unit being preselected for heating mode does not provide the cooling load required by the installation, then preselection shall be changed by choosing the immediately higher unit.

- **Step 2: Correction of cooling capacity for piping length**

  The actual cooling capacity of the preselected unit must be calculated applying the necessary correction factors:

$$Q_C = Q_{MC} \times f_{LC}$$

  Q_C: Actual cooling capacity (kW)
  Q_{MC}: Maximum cooling capacity (kW)
  f_{LC}: Correction factor for cooling piping length

  The maximum cooling capacity (Q_{MC}) of the RAS-4WHVNPE + RWM-4.0NE(-W) system is 15.1 kW.

  - Calculation of f_{LC}:

    To determine this value, it is necessary to refer to section *"Cooling piping length correction factor"*. In the example shown in this chapter (equivalent piping length of 20 metres, with the indoor unit placed 15 metres lower than the outdoor unit), the resulting piping length correction factor is **0.978**, approximately.

  - Calculation of Q_C:

    Once the correction factors to be applied have been determined, the formula for actual cooling capacity of the RAS-4WHVNPE + RWM-4.0NE(-W) system can be applied:

    $Q_C = 15.1\ kW \times 0.978 =$ ***14.76 kW***

    The actual cooling capacity of the RAS-4WHVNPE + RWM-4.0NE(-W) system (14.76 kW) is greater than the cooling load required by the installation (14.5 kW). Therefore, the preselection is considered valid for both heating and cooling.

    NOTE

    If the calculated actual cooling capacity is lower than that provided by the preselected unit, the calculation must be done again with the immediately higher unit.

4.1.2.2 Description of procedure for YUTAKI S COMBI

The following selection procedure is described in this chapter:

a. Selection of system combination (outdoor unit + indoor unit)
   i. Without heating source (monovalent system)
   ii. With additional heating source (monoenergy / bivalent system)
b. Selection of the capacity of the domestic hot water tank (200/260 litres).

NOTE

The following selection procedure is the same in the case of YUTAKI S COMBI for solar combination and YUTAKI S COMBI for UK-marked models.

a.i) Monovalent system (regular selection)

In the case of normal selection of monovalent system (without additional heating sources), the YUTAKI S COMBI is selected depending on the required heating load.

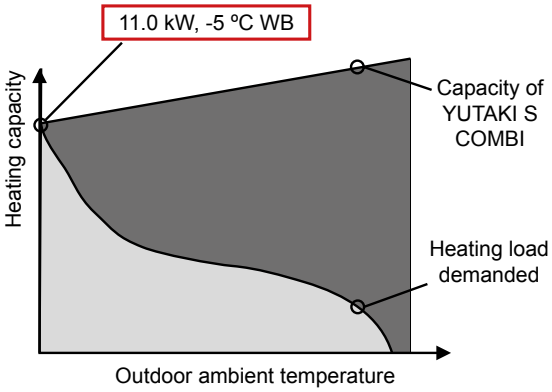
NOTE

The example given in this chapter is the regular selection, as the YUTAKI S COMBI has been designed to cover all the heating requirements, even on the coldest days of the year.

- **Step 1: Initial preselection**

Proposed energy system	Monovalent
Inlet/outlet water temperature	30/35 ºC
Ambient temperature WB/DB on the coldest day of the year (RH = 85%)	-2/-1 ºC
Heating load required on the coldest day of the year	11.0 kW

Installation restrictions	
Installation type	Radiant floor
Power supply	1~ 230 V 50 Hz
Height difference of indoor unit with respect to outdoor unit	15 m lower
Equivalent piping length between outdoor and indoor unit	20 m



These conditions determine the position in the Maximum heating capacity tables (see section *"4.4.1 Maximum heating capacity table (kW) (Integrated)"*, where it can be confirmed whether the unit has enough heating capacity to cover the heating load required by the installation on the coldest day of the year (11.0 kW for an inlet/outlet water temperature of 30/35 ºC and an ambient temperature of -2 ºC WB).

YUTAKI S COMBI System	Maximum heating capacity (kW)
RAS-2WHVNP + RWD-2.0NWE-(200/260)S	5.16
RAS-2.5WHVNP + RWD-2.5NWE-(200/260)S	6.40
RAS-3WHVNP + RWD-3.0NWE-(200/260)S	7.92
☛ **RAS-4WHVNPE + RWD-4.0NWE-(200/260)S**	**11.83**
RAS-5WHVNPE + RWD-5.0NWE-(200/260)S	13.10
RAS-6WHVNPE + RWD-6.0NWE-(200/260)S	14.06

The YUTAKI S COMBI system that covers the heating requirements of the installation is the combination of RAS-4WHVNPE + RWD-4.0NWE-(200/260)S. Therefore, this becomes the preselected YUTAKI S COMBI system.

NOTE

In case of working with an ambient temperature value not included in the Maximum heating capacity tables in the "4.4.1 Maximum heating capacity table (kW) (Integrated)" section (for example, -3 ºC), interpolation is required using the values above and below the ambient temperature.

- **Step 2: Heating capacity correction for piping length**

The actual heating capacity of the preselected unit must be calculated applying the necessary correction factors:

$$Q_H = Q_{MH} \times f_{LH}$$

Q_H: Actual heating capacity (kW)

Q_{MH}: Maximum heating capacity (kW)

f_{LH}: Heating piping length correction factor

The maximum heating capacity (Q_{MH}) of the RAS-4WHVNPE + RWD-4.0NWE-(200/260)S system is 11.83 kW.

- Calculation of f_{LH}:

  Both the length of the refrigerant piping used and the height difference between the outdoor unit and the indoor unit directly affect the performance of the unit. This concept is quantified by means of the correction factor for piping length.

  To determine this value, it is necessary to refer to section *"Heating piping length correction factor"*. In the example shown in this chapter (equivalent piping length of 20 metres, with the indoor unit placed 15 metres lower than the outdoor unit), the resulting piping length correction factor is ***0.988.***

- Calculation of Q_H:

  Once the correction factors to be applied have been determined, the formula for actual heating capacity of the RAS-4WHVNPE + RWD-4.0NWE-(200/260)S(-W) system can be applied:

  Q_H = 11.83 kW x 0.988 = 11.68 kW

  The preselection is valid, since the actual heating capacity of the RAS-4WHVNPE + RWD-4.0NWE-(200/260)S system (11.68 kW) is greater than the heating load required by the installation (11.0 kW).

  NOTE

  If the calculated actual heating capacity is lower than the required heating load, the calculation must be done again with the immediately higher unit. If there is no unit higher than the preselected one, some other system (such as combination with boiler or electric heater accessory) should be considered.

a.ii) Use of auxiliary heating source (combination with electric heater or boiler)

When there is already a conventional boiler (gas/oil) in the installation, it can be used for alternate operation with the YUTAKI S COMBI (bivalent system). This helps to increase the overall performance of the whole installation significantly.

The indoor unit has also a built-in electric heater which can provide the additional heat load if required (monoenergy system).

In any case, the previous description of procedure can be applied to all the aforementioned energy systems, but including a heat load check when using an auxiliary heating source (monoenergy or bivalent systems) and recalculating the new heating points.

It is verified whether the combination (YUTAKI S COMBI + electric heater / boiler) covers the exceptional needs on the coldest days of the year.

Monoenergy and bivalent systems are useful when there is a constant regular heating load with short periods of heating load peaks occurring on the coldest days of the year.

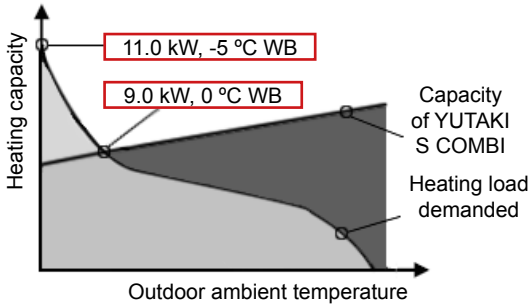
NOTE

The following check can be used equally for both of the combinations.

- **Step 1: Initial preselection**

Proposed energy system	Monoenergy
Inlet/outlet water temperature	30/35 ºC
Regular ambient temperature WB/DB (RH = 85%)	2/3 °C
Required regular heating load	9.0 kW
Ambient temperature WB/DB on the coldest day of the year (RH = 85%)	-7/-6 ºC
Heating load required on the coldest day of the year	11.0 kW

Installation restrictions	
Installation type	Radiant floor
Power supply	1~ 230 V 50 Hz
Height difference of indoor unit with respect to outdoor unit	15 m lower
Equivalent piping length between outdoor and indoor unit	20 m



In this new system, the heat pump meets the regular heating load. The electric heater can provide the auxiliary heating capacity required to cover the peak heating load of 11.0 kW (-7 ºC WB) on the coldest days of the year.

NOTE

Even though the RAS-3WHVNP + RWD-3.0NWE-(200/260)S combination has a slightly lower maximum heating capacity than required heating load, it cannot be selected since capacity becomes lower after the application of correction factors. Therefore, the immediately higher combination is taken.

YUTAKI S COMBI System	Maximum heating capacity (kW)
RAS-2WHVNP + RWD-2.0NWE-(200/260)S	5.50
RAS-2.5WHVNP + RWD-2.5NWE-(200/260)S	7.00
RAS-3WHVNP + RWD-3.0NWE-(200/260)S	8.90
☛ **RAS-4WHVNPE + RWD-4.0NWE-(200/260)S**	**12.80**
RAS-5WHVNPE + RWD-5.0NWE-(200/260)S	13.90
RAS-6WHVNPE + RWD-6.0NWE-(200/260)S	15.00

The maximum heating capacity of this new system for an ambient temperature of 2 ºC WB and a water inlet/outlet temperature of 30/35 ºC is 12.8 kW. The result of applying the heating piping length correction factor of 0.988, just like in point a.i), is:

$$Q_H = 12.8\ kW \times 0.988 = \mathbf{12.64\ kW}$$

The heating capacity of the new system for the conditions of the coldest days (-7 ºC WB) has to be calculated with the help of the Maximum heating capacity tables.

The maximum heating capacity for an ambient temperature of -7 ºC WB and a water inlet/outlet temperature of 30/35ºC is 10.62 kW.

- **Step 2: Heating capacity correction for piping length**

  The actual heating capacity of the selected system for the coldest days of the year is calculated by applying the correction factors for piping length, following the previously used method.

$$Q_H = Q_{MH} \times f_{LH}$$

  Q_H: Actual heating capacity (kW)

  Q_{MH}: Maximum heating capacity (kW)

  f_{LH}: Heating piping length correction factor

  - Calculation of f_{LH}:

    The resulting piping length correction factor is ***0.988.***

  - Calculation of Q_H:

    Once the corresponding correction factors have been determined, the formula for actual heating capacity of the RAS-4WHVNPE + RWD-4.0NWE-(200/300)S system can be applied:

    $Q_H = 10.62 \times 0.988 =$ ***10.49 kW***

- **Step 3: Calculation for the heating capacity of the combination (YUTAKI S COMBI with electric heater)**

  Once the corresponding correction factors are applied, the actual heating capacity provided by the RAS-4WHVNPE + RWD-4.0NWE-(200/260)S system on the coldest days is 9.84 kW. This heating capacity does not cover the required heating load for the coldest days (10.49 kW).

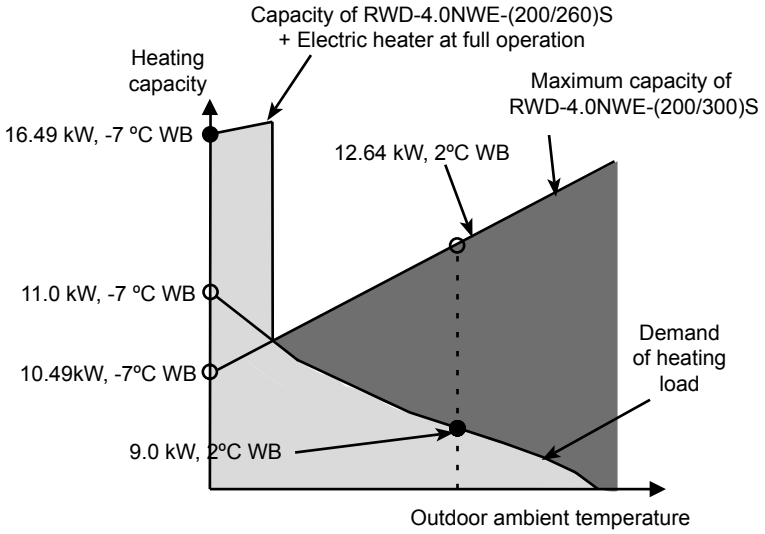
  In these cases, the built-in electric heater in the YUTAKI S COMBI indoor unit is to provide the auxiliary capacity required to cover exceptional heating needs.

  This electric heater provides a maximum power of 6.0 kW for this unit, which must be added to the heating capacity provided by the preselected unit. The result is:

  $Q_H = 10.49\ kW + 6\ kW =$ ***16.49 kW***

  In this example, the resulting heating capacity is higher than the heating demand of 11.0 kW estimated for the coldest days of the year, so the preselection of the RAS-4WHVNPE + RWD-4.0NWE-(200/260)S system is considered valid.

  The resulting energy system is as follows:

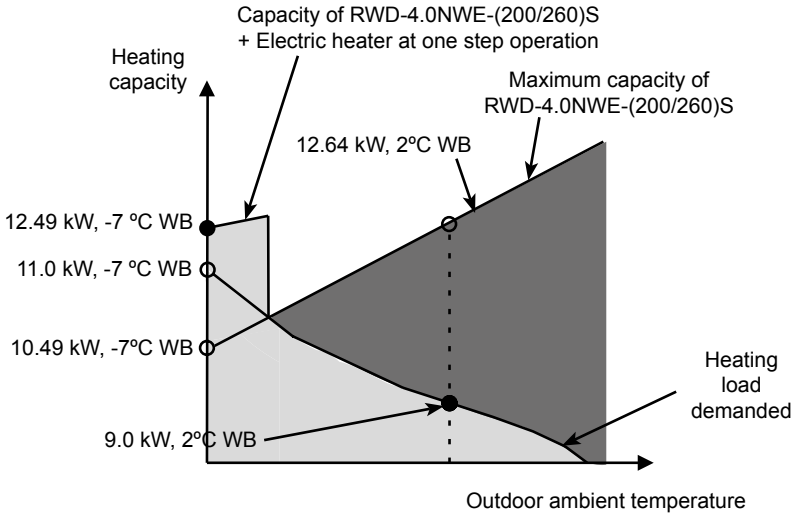


Three-step electric heater control

The heating capacity supplied by the electric heater can be more precisely adjusted by means of the three-step electric heater control. When the electric heater operates in steps 1 or 2, the power input is reduced in comparison with the total power input of the electric heater.

In this example, this option can be applied. The electric heater can operate in step 1 (2.0 kW), covering the required heating load for the coldest days with a reduction of power input. The result is:

Q_H= *10.49 kW + 2.0 kW =* ***12.49 kW***



b) Selection of the domestic hot water tank

Two different DHW tank models, with respective capacities of 200 and 260 litres, can be selected according to the water demand. In order to determine the suitable tank size it is necessary to estimate the daily water demand, using the following calculation formula for consumption:

$$D_i(T) = D_i(60ºC) \times (60-T_i / T-T_i)$$

Where:

D_i(T): ***Water demand at T temperature***
D_i(60ºC): ***Domestic hot water demand at 60 ºC***
T: ***Temperature of the domestic hot water tank***
T_i: ***Temperature of the inlet cold water***

- Calculation of ***D_i(60 ºC)***:

  The standard consumption, expressed in daily litres per person and determined by technical installation regulations of each country, is used to calculate the domestic hot water demand at 60 ºC***, D_i(60 ºC)***. This quantity is then multiplied by the expected number of users of the installation. In the following example, the domestic hot water demand at 60 ºC has been considered as 30 litres per person, in a detached house with 4 residents (3 bedrooms).

- Calculation of ***T***:

  The temperature of the domestic hot water tank is an estimation referred to the temperature of the accumulated water inside the tank, prior to operation. This temperature is usually between 45 ºC and 65 ºC. It has been considered as 45 ºC in this example.

- Calculation of ***T_i***:

  The temperature of the inlet cold water refers to the temperature of the water being supplied to the tank. Since this temperature is usually between 10 ºC and 15 ºC, Ti=12 ºC is used in this example to calculate an approximate water demand.

- Example:

$D_i(T)$= 120 x (60-12 / 45-12) = **174.6 litres/day** (*)

NOTE

(*): Different strategies of accumulation can be applied, depending on the electric tariff, the installation space and the cost/efficiency relation. In case that a low-cost electric tariff strategy is selected (accumulation strategy), the daily water demand could double that of the normal case (semi accumulation strategy).

The election of the water tank depends on the following table:

Daily water demand	Size of domestic hot water tank
Less than 185 litres	RWD-(2.0-6.0)NWE-200S
More than 185 litres	RWD-(2.0-6.0)NWE-260S

NOTE

- *The storage capacity of the tank has to be adjusted to daily consumption in order to avoid stagnation of water.*
- *This procedure for selection of a domestic hot water tank is merely illustrative; please refer to the applicable local regulations in order to ensure a proper water demand value.*

◆ Cooling mode (as an option, adding the cooling kit accessory and the setting for cooling mode)

Description of the procedure

Upon verification that the selected system (monoenergy) is able to cover all the heating needs, it is necessary to perform the same check for cooling mode, in order to obtain the cooling capacity of the system.

- **Step 1: Initial preselection**

Inlet/outlet water temperature	23/18 ºC
Ambient temperature DB	30 °C
Required cooling load	14.5 kW

Installation restrictions	
Installation type	Refreshing floor

These conditions determine the position in the Maximum cooling capacity tables (See section *"4.4.2 Maximum cooling capacity table (kW)"*), where it can be confirmed whether the unit preselected for heating mode can provide the cooling load required by the installation (14.5 kW for an inlet/outlet water temperature of 23/18 ºC and an ambient temperature of 30 ºC DB).

YUTAKI S COMBI system	Maximum cooling capacity (kW)
RAS-4WHVNPE + RWD-4.0NWE-200S	15.1

The RAS-4WHVNPE + RWD-4.0NWE-200S system provides a theoretical cooling capacity (15.1 kW) greater than the cooling load required by the installation (14.5 kW). Therefore, the calculation process can continue.

NOTE

If the unit being preselected for heating mode does not provide the cooling load required by the installation, the preselection should be changed by choosing the immediately higher unit.

- **Step 2: Cooling capacity correction for defrost and piping length**

  The actual cooling capacity of the preselected unit is calculated by applying the necessary correction factors:

$$Q_C = Q_{MC} \times f_{LC}$$

  Q_C: Actual cooling capacity (kW)

  Q_{MC}: Maximum cooling capacity (kW)

  f_{LC}: Cooling piping length correction factor

  The maximum cooling capacity (Q_{MC}) of the RAS-4WHVNPE + RWD-4.0NWE-200S system is 15.1 kW.

  - Calculation of f_{LC}:

    To determine this value, it is necessary to refer to section *"Cooling piping length correction factor"*. In the example shown in this chapter (equivalent piping length of 20 metres, with the indoor unit placed 15 metres lower than the outdoor unit), the resulting piping length correction factor is **0.978** approximately.

  - Calculation of Q_C:

    Once the correction factors to be applied have been determined, the formula for actual cooling capacity of the RAS-4WHVNPE + RWD-4.0NWE-200S system can be applied:

    $Q_C = 15.1\ kW \times 0.978 =$ ***14.76 kW***

    The preselection is valid both for heating and cooling, since the actual cooling capacity of the RAS-4WHVNPE + RWD-4.0NWE-200S system (11.25 kW) is greater than the cooling load required by the installation (14.5 kW).

    NOTE

    If the calculated actual cooling capacity is lower than that provided by the preselected unit, the calculation must be done again with the immediately higher unit.

4.1.2.3 Description of procedure for YUTAKI S80

The following selection procedure is described in this chapter:

a. Selection of system combination (outdoor unit + indoor unit)
   i. Without heating source (monovalent system)
   ii. With additional heating source (monoenergy / bivalent system)
b. Selection of the capacity of the domestic hot water tank accessory (optional).

a.i) Monovalent system (regular selection)

In the case of normal selection of monovalent system (without additional heating sources), the YUTAKI S80 is selected depending on the required heating load.

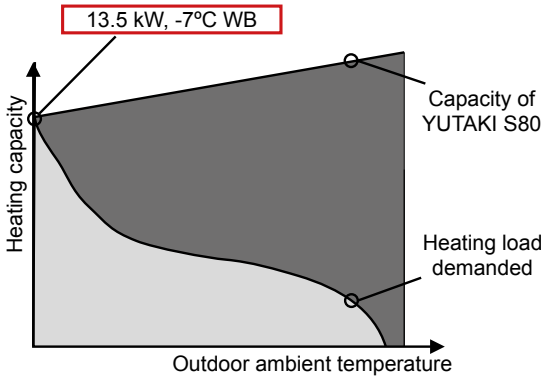
NOTE

The example given in this chapter is the regular selection as the YUTAKI S80 has been designed to cover all the heating requirements, even on the coldest days of the year.

- **Step 1: Initial preselection**

Proposed energy system	Monovalent
Inlet/outlet water temperature	47/55ºC
Ambient temperature WB/DB in the coldest day of the year (RH = 85%)	-7/-6ºC
Heating load required on the coldest day of the year	13.5 kW

Installation restrictions	
Installation type	Radiant floor
Power supply	1~ 230V 50Hz
Height difference of indoor unit with respect to outdoor unit	15 m or lower
Equivalent piping length between outdoor and indoor unit	20 m



4

These conditions determine the position in the Maximum heating capacity tables (see section *"4.5.1 Maximum heating capacity table (kW) (Integrated)"*), where it can be confirmed whether the unit has enough heating capacity to cover the heating load required by the installation on the coldest day of the year (13.5 kW for an inlet/outlet water temperature of 47/55 ºC and an ambient temperature of -7 ºC WB).

YUTAKI S80	Maximum heating capacity (kW)
RAS-4WHVNPE + RWH-4.0VNF(W)E	12.50
RAS-5WHVNPE + RWH-5.0VNF(W)E	**14.50**
RAS-6WHVNPE + RWH-6.0VNF(W)E	16.10

NOTE

Even though the RAS-4WHVNPE + RWH-4.0VNF(W)E combination has a slightly higher maximum heating capacity than the required heating load, it is necessary to select the immediately higher combination since heating capacity becomes lower after applying the correction factors in step 2.

According to the table, the YUTAKI S80 system that covers the heating requirements of the installation is the combination of RAS-5WHVNPE + RWH-5.0VNF(W)E. Therefore, this becomes the preselected YUTAKI S80 system.

NOTE

In case of working with an ambient temperature value not included in the Maximum heating capacity tables in the "4.5.1 Maximum heating capacity table (kW) (Integrated)"section (for example, -3ºC), interpolation is required using the values above and below the ambient temperature.

- **Step 2: Correction of heating capacity for piping length**

The actual heating capacity of the preselected unit must be calculated applying the necessary correction factors:

$$Q_H = Q_{MH} \times f_{LH}$$

Q_H *:* ***Actual heating capacity (kW)***
Q_{MH} *:* ***Maximum heating capacity (kW)***
f_{LH} *:* ***Correction factor for heating piping length***

The maximum heating capacity (Q_{MH}) of the RAS-5WHVNPE + RWH-5.0VNF(W)E system is 14.50 kW.

- Calculation of f_{LH}:

  Both the length of the refrigerant piping used and the height difference between the outdoor unit and the indoor unit directly affect the performance of the unit. This concept is quantified by means of the correction factor for piping length.

  To determine this value, it is necessary to refer to section *"Heating piping length correction factor"*. In the example shown in this chapter (equivalent piping length of 20 metres, with the indoor unit placed 15 metres lower than the outdoor unit), the resulting piping length correction factor is **0.988**.

- Calculation of Q_H:

  Once the correction factors to be applied have been determined, the formula for actual heating capacity of the RAS-5WHVNPE + RWH-5.0VNF(W)E system can be applied:

  Q_H *= 14.50 kW x 0.988 =* ***14.33 kW***

  The preselection is valid, since the actual heating capacity of the RAS-5WHVNPE + RWH-5.0VNF(W)E system (14.33 kW) is greater than the heating load required by the installation (13.5 kW).

  NOTE

  If the calculated actual heating capacity is lower than the required heating load, the calculation must be done again with the immediately higher unit. If there is no unit higher than the preselected one, some other system (such as combination with boiler or electric heater accessory) should be considered.

a.ii) Use of auxiliary heating source (combination with electric heater or boiler)

When there is already a conventional boiler (gas/oil) in the installation, it can be used for alternate operation with the YUTAKI S80 (bivalent system). This helps to increase the overall performance of the whole installation significantly.

An electric heater can also be installed as an accessory for the monoenergy system, if an additional heat load is required.

In any case, the previous description of procedure can be applied to all the aforementioned energy systems, but including a heat load check when using an auxiliary heating source (monoenergy or bivalent systems) and recalculating the new heating points.

It is verified whether the combination (YUTAKI S80 + electric heater / boiler) covers the exceptional needs on the coldest days of the year.

Monoenergy and bivalent systems are useful when there is a constant regular heating load with short periods of heating load peaks occurring on the coldest days of the year.

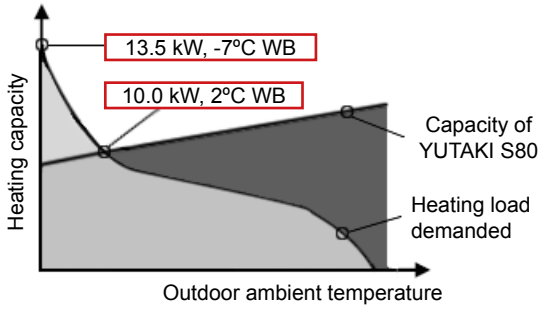
NOTE

The following check can be used equally for both of the combinations.

- **Step 1: Initial preselection**

Proposed energy system	Monoenergy
Inlet/outlet water temperature	47/55 ºC
Regular ambient temperature WB/DB (RH = 85%)	2/3 °C
Required regular heating load	10.0 kW
Ambient temperature WB/DB on the coldest day of the year (RH = 85%)	-7/-6 ºC
Heating load required on the coldest day of the year	13.5 kW

Installation restrictions	
Installation type	Radiant floor
Power supply	1~ 230V 50Hz
Height difference of Indoor unit with respect to outdoor unit	15 m lower
Equivalent piping length between outdoor and indoor unit	20 m



In this new system, the heat pump meets the regular heating load. The electric heater can provide the auxiliary heating capacity required to cover the peak heating load of 13.5 kW (-7 ºC WB) on the coldest days of the year.

As the heating load has been lowered to 10.0 kW, with this point being taken as the regular heating load, it is possible to reselect the required unit. The RAS-5WHVNPE + RWH-5.0VNF(W)E system would provide too much heating capacity, while the RAS-4WHVNPE + RWH-4.0VNF(W)E system is suited for these new conditions.

YUTAKI S80	Maximum heating capacity (kW)
RAS-4WHVNPE + RWH-4.0VNF(W)E	**13.54**
RAS-5WHVNPE + RWH-5.0VNF(W)E	15.70
RAS-6WHVNPE + RWH-6.0VNF(W)E	16.30

The maximum heating capacity of this new system for an ambient temperature of 2 ºC WB and a water inlet/outlet temperature of 47/55 ºC is **13.54 kW**. The result of applying the heating piping correction factor of 0.988, just like in point a.i), is:

$$Q_H = 13.54\ kW \times 0.988 = \mathbf{13.38\ kW}$$

The heating capacity of the new system for the conditions of the coldest days (-7 ºC) has to be calculated with the help of the Maximum heating capacity tables.

The maximum heating capacity for an ambient temperature of -7ºC WB and a water inlet/outlet temperature of 47/55ºC is **12.5 kW**.

- **Step 2: Heating capacity correction for piping length**

  The actual heating capacity of the selected system for the coldest days of the year is calculated by applying the correction factors for piping length, following the previously used method.

$$Q_H = Q_{MH} \times f_{LH}$$

  Q_H ***Actual heating capacity (kW)***
  Q_{MH} ***Maximum heating capacity (kW)***
  f_{LH} ***Heating piping length correction factor***

  - Calculation of f_{LH}:

    The resulting piping length correction factor is **0.988**.

  - Calculation of Q_H:

    Once the corresponding correction factors have been determined, the formula for actual heating capacity of the RAS-4WHVNPE + RWH-4.0VNF(W)E system can be applied:

    $Q_H = 12.5\ kW \times 0.988 =$ ***12.35 kW***

- **Step 3: Calculation for the heating capacity of the combination (YUTAKI S80 with electric heater)**

  Once the corresponding correction factors are applied, the actual heating capacity provided by the RAS-4WHVNPE + RWH-4.0VNF(W)E system is 12.35 kW. This heating capacity does not cover the required heating load for the coldest days (13.5 kW).

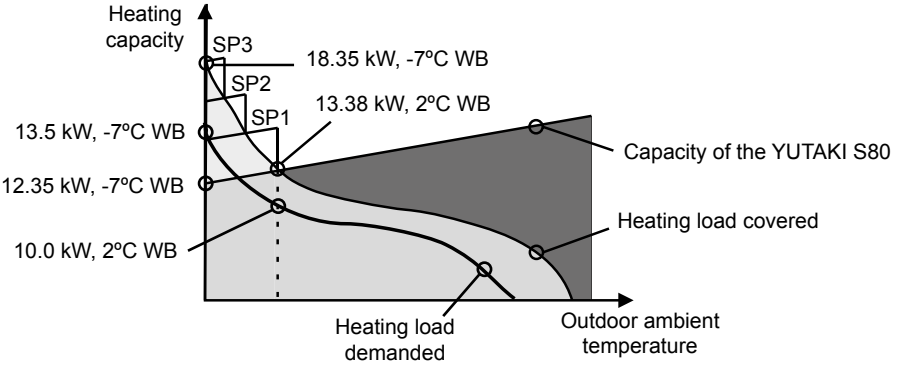
  In these cases, the electric water heater supplied by HITACHI as an accessory (WEH-6E) is to provide the auxiliary capacity required to cover exceptional heating needs.

  The auxiliary electric heater provides a maximum power of 6.0 kW, which must be added to the heating capacity provided by the preselected unit. The result is:

  $Q_H = 12.35\ kW + 6\ kW =$ ***18.35 kW***

  In this example, the resulting heating capacity is higher than the heating demand of 13.0 kW estimated for the coldest days of the year, so the preselection of the RAS-4WHVNPE + RWH-4.0VNF(W)E system is considered valid.

  The resulting energy system is as follows:

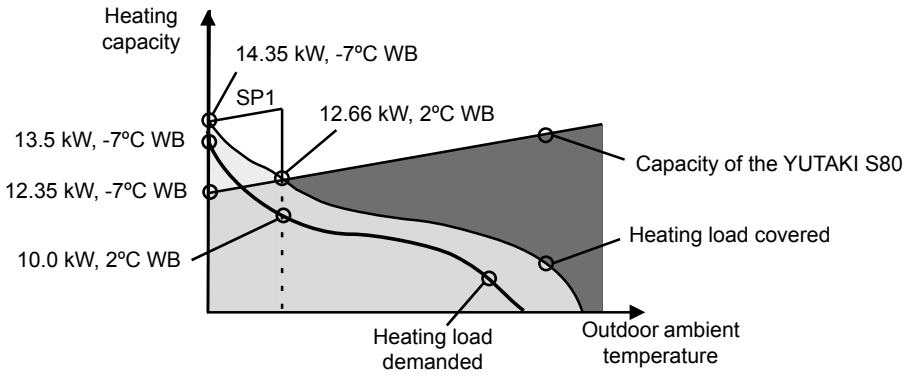


  Three-step electric heater control

  The desired heating capacity provided by the electric heater can be more precisely adjusted by means of the three-step electric heater control. When the electric heater operates in steps 1 or 2, the power input is reduced in comparison with the total power input of the electric heater.

  In this example, this option can be applied. The electric heater can operate in step 1 (2.0 kW), covering the required heating load for the coldest days with a reduction of power input. The result is:

  $Q_H = 12.35\ kW + 2.0\ kW =$ ***14.35 kW***



b) Selection of the domestic hot water tank accessory (only for RWH-(4.0-6.0)(V)NFWE series)

The domestic hot water tank accessory applicable to the YUTAKI S80 system (RWH-(4.0-6.0)(V)NFWE series) is the DHWS200S-2.7H2E or DHWS260S-2.7H2E, depending on the daily water demand and the combination method. The daily water demand is estimated with the following calculation formula for consumption.

$$D_i(T) = D_i(60ºC) \times (60-T_i / T-T_i)$$

Where:

D_i(T): ***Water demand at T temperature***
D_i(60ºC): ***Domestic hot water demand at 60 ºC***
T: ***Domestic hot water tank's temperature***
T_i: ***Inlet cold water temperature***

- Calculation of ***D_i(60 ºC)***:

  The standard consumption, expressed in daily litres per person and determined by technical installation regulations of each country, is used to calculate the domestic hot water demand at 60 ºC***, D_i(60 ºC)***. This quantity is then multiplied by the expected number of users of the installation. In the following example, the domestic hot water demand at 60 ºC has been considered as 30 litres per person, in a detached house with 4 residents (3 bedrooms).

- Calculation of ***T***:

  The temperature of the domestic hot water tank is an estimation referred to the temperature of the accumulated water inside the tank, prior to operation. This temperature is usually between 45 ºC and 65 ºC. It has been considered as 45 ºC in this example.

- Calculation of ***T_i***:

  The temperature of the inlet cold water refers to the temperature of the water being supplied to the tank. The usual range of cold water temperature is between 10 ºC and 15 ºC. 12 ºC is used in this example to calculate an approximate water demand.

- Example:

  D_i(T)= 120 x (60-12 / 45-12) = ***174.6 litres/day*** *(*)*

NOTE

(*): Different strategies of accumulation can be applied, depending on the electric tariff, the installation space and the cost/ efficiency relation. In case that a low-cost electric tariff strategy is selected (accumulation strategy), the daily water demand could double that of the normal case (semi accumulation strategy).

The election of the water tank depends on the following table:

Daily water demand	Size of domestic hot water tank
Less than 185 litres	DHWS200S-2.7H2E
More than 185 litres	DHWS260S-2.7H2E

YUTAKI S80 system	Domestic hot water tank
RAS-4WH(V)NPE + RWH-4.0(V)NFWE RAS-5WH(V)NPE + RWH-5.0(V)NFWE RAS-6WH(V)NPE + RWH-6.0(V)NFWE	DHWS200S-2.7H2E DHWS260S-2.7H2E

NOTE

- *The storage capacity of the tank has to be adjusted to daily consumption in order to avoid stagnation of water.*
- *The YUTAKI S80 is designed to be used in combination with a HITACHI domestic hot water tank. In case that another tank is being used in combination with YUTAKI S80, HITACHI cannot guarantee the proper operation or reliability of the system.*
- *This procedure for selection of a domestic hot water tank is merely illustrative; please refer to the applicable local regulations in order to ensure a proper water demand value.*

b) Selection of the domestic hot water tank accessory (only for RWH-(4.0-6.0)(V)NFE series)

The domestic hot water tank accessory corresponding to the YUTAKI S80 system (RWH-(4.0-6.0)(V)NFE series) is either DHWT-200S-3.0H2E or DHWT-300S-3.0H2E, depending on the water demand and the combination method. The daily water demand is estimated with the following calculation formula for consumption:

$$D_i(T) = D_i(60ºC) \times (60-T_i / T-T_i)$$

Where:

$D_i(T)$: ***Water demand at T temperature***

$D_i(60ºC)$: ***Domestic hot water demand at 60 ºC***

T: ***Temperature of the domestic hot water tank***

T_i: ***Temperature of the inlet cold water***

- Calculation of ***$D_I(60 ºC)$***:

  The standard consumption, expressed in daily litres per person and determined by technical installation regulations of each country, is used to calculate the domestic hot water demand at 60 ºC, ***$D_i(60 ºC)$***. This quantity is then multiplied by the expected number of users of the installation. In the following example, the domestic hot water demand at 60 ºC has been considered as 30 litres per person, in a detached house with 4 residents (3 bedrooms).

- Calculation of ***T***:

  The temperature of the domestic hot water tank is an estimation referred to the temperature of the accumulated water inside the tank, prior to operation. This temperature is usually between 45 ºC and 65 ºC. It has been considered as 45 ºC in this example.

- Calculation of ***Ti***:

  The temperature of the inlet cold water refers to the temperature of the water being supplied to the tank. The temperature of cold water is in the range between 10 ºC and 15 ºC. 12 ºC is used in this example to calculate an approximate water demand.

- Example:

  $D_i(T) = 120 \times (60-12 / 45-12) =$ ***174.6 litres/day***

  174.6 x 2(*) = ***349.2 litres/day*** *approximate demand of hot water*

NOTE

(*) It is recommended to multiply the calculated consumption by two, in case that the installation is in a detached house. This is done to ensure a steady supply of hot water. In the case of a multifamily installation, it is not necessary to increase the forecast of hot water demand, given the lower simultaneity factor.

Therefore, a 300 litre tank is recommended when the system is a combination of RAS-4WHVNPE + RWH-4.0VNFE or higher, in order to ensure a longer supply of hot water and a better system performance. In case that the conditions of demand are lower than those specifications, a tank with a capacity of 200 litres can be selected, depending on the demand conditions. A table with the selection of domestic hot water (DHW) tanks recommended by HITACHI for the different existing combinations is shown below:

YUTAKI S 80 system	Domestic hot water tank
RAS-4WH(V)NPE + RWH-4.0(V)NFE	DHWT-300S-3.0H2E
RAS-5WH(V)NPE + RWH-5.0(V)NFE	
RAS-6WH(V)NPE + RWH-6.0(V)NFE	

NOTE

- *The YUTAKI S80 system is designed for combination with a HITACHI domestic hot water tank. In case that another tank is being used in combination with a YUTAKI S80 system, HITACHI cannot guarantee the correct operation or reliability of the system.*
- *This procedure for selection of a domestic hot water tank is merely illustrative; please refer to the applicable local regulations in order to ensure a proper water demand value.*

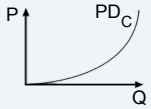
4.1.2.4 Selection procedure for YUTAKI M units

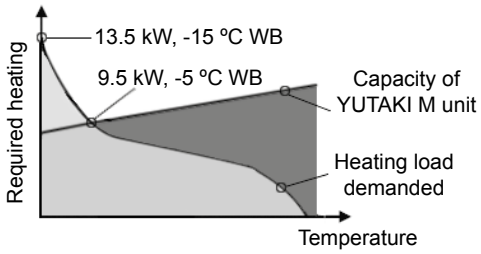
The selection procedure explained in this chapter is a simple example structured into three main blocks:

- Choice of the energy system to be used (monoenergy in this case), and selection of a YUTAKI M unit depending on the normal heating load
- Check to ensure that the combination (YUTAKI M + electric heater) covers the exceptional needs of the coldest days of the year
- Selection of the domestic hot water tank accessory

a) Selection for a regular heating load

- **Step 1: Initial preselection**

Proposed energy system	Monoenergetic
Regular ambient temperature WB/DB (RH = 85%)	-7/-6 °C
Required regular heating load	10.5 kW
Ambient temperature WB/DB on the coldest day of the year (RH = 85%)	-15 / -14.5 ºC
Heating load required on the coldest day of the year	13.5 kW
Inlet/outlet water temperature	40 / 45 ºC
Power supply	1~ 230V 50Hz
Type of glycol to use	Ethylene
Pressure loss on the client's hydraulic installation (PD_C)	



These conditions determine the position in the table of *"4.6.1 Maximum heating capacity table (kW) (Integrated)"*section, where it can be confirmed whether the unit has enough heating capacity to cover the regular heating load required by the installation (10.5 kW for an inlet/outlet water temperature of 40/45 ºC and an ambient temperature of -7ºC WB).

YUTAKI M Unit	Maximum heating capacity (kW)
RASM-3VNE	6.40
RASM-4VNE	10.00
RASM-5VNE	**11.60**
RASM-6VNE	12.50

According to the table, the YUTAKI M unit that covers the heating requirements of the installation is the RASM-5VNE. Therefore, this becomes the preselected unit.

NOTE

In case of working with an ambient temperature value not included in the tables of "4.6.1 Maximum heating capacity table (kW) (Integrated)" (for example, -3ºC), interpolation is required using the values above and below the ambient temperature.

- **Step 2: Heating capacity correction for use of glycol**

The actual heating capacity of the preselected unit must be calculated applying the necessary correction factors:

$$Q_h = Q_{Mh} \times f_{gh}$$

Q_h: Actual heating capacity (kW)

Q_{Mh}: Maximum heating capacity (kW)

f_{gh}: Capacity correction factor owing to use of glycol

The maximum heating capacity (Q_{Mh}) of the RHUE-5AVHN-HM unit is 11.60 kW.

- Calculation of f_{gh}:

The unit may be damaged by water freezing in the pipes during shutdown periods, under low ambient temperatures in winter. An antifreeze mixture with glycol is used to prevent this.

On the other hand, the percentage of glycol used may affect the heating capacity of the unit.

To calculate the capacity correction factor due to the use of glycol, please refer to the *"4.7.2 Correction factor owing to use of glycol (only for YUTAKI M)"* section, bearing in mind the type of glycol to be used. In this example, ethylene is used.

The ambient temperature value of -4 ºC DB does not appear in the table. Therefore, the percentage of ethylene glycol to be used corresponds to the immediately lower ambient temperature in the table. In this case, it is -7 ºC.

At this ambient temperature, the necessary percentage of ethylene glycol is 20%, for which the corresponding capacity correction factor owing to the use of ethylene glycol of **1**.

- Calculation of Q_h:

Once the correction factors to be applied have been determined, the formula for actual heating capacity of the unit RHUE-5AVHN-HM can be applied:

Q_h = *11.3 kW x 1* = **11.3 kW**

The preselection of the RASM-5VNE unit is valid, since its actual heating capacity (11.3 kW) is greater than the heating load required by the installation (10.5 kW).

NOTE

If the calculated actual heating capacity is lower than that provided by the preselected unit, the calculation must be done again with the immediately higher unit. If there is no unit higher than the preselected one, some other system or the regular use of an electric heater should be considered.

b) Selection for the coldest days of the year (use of the auxiliary electric heater)

The previous calculation shows that the RASM-5VNE unit provides a heating capacity of 13.3 kW (-7 ºC WB), which is greater than the regular heating load necessary of 10.5 kW, but does not reach the peak heating load of 13.5 kW (-15 ºC WB) necessary on the coldest days of the year. The auxiliary electric heater is used in these cases.

The aim of this section is to check that the energy system chosen (combination of the YUTAKI M unit + auxiliary electric heater) covers the temporary heating requirements for the coldest days of the year.

- **Step 1: Initial preselection**

  As the ambient temperature is lowered to -15 ºC, the capacity tables in the *"Maximum heating capacity table"* section must be consulted again to determine the maximum heating capacity that the RASM-5VNE unit can provide under these new conditions.

  The maximum heating capacity for an ambient temperature of -15 ºC WB and a water inlet/outlet temperature of 40/45 ºC is **9.43 kW.**

- **Step 2: Correction of the heating capacity owing to the use of glycol**

  The actual heating capacity of the selected unit for the coldest days of the year is calculated by applying correction factors for defrosting and glycol, following the previously used method.

$$Q_h = Q_{Mh} \times f_{gh}$$

Q_h: Actual heating capacity (kW)

Q_{Mh}: Maximum heating capacity (kW)

f_d: Defrosting correction factor

f_{gh}: Capacity correction factor owing to use of glycol

- Calculation of f_{gh}:

  The ambient temperature value of -14.5 ºC DB does not appear in the tables in *"4.7.2 Correction factor owing to use of glycol (only for YUTAKI M)"* section. Therefore, the percentage of ethylene glycol to use corresponds to the immediately lower ambient temperature in the table. In this case, it is -22 ºC.

  At this ambient temperature, the necessary percentage of ethylene glycol is 40%, for which there is a corresponding capacity correction factor, owing to the use of ethylene glycol, of **0.99**.

- Calculation of Q_h:

  Once the correction factors to be applied have been determined, the formula for actual heating capacity of the RHUE-5AVHN-HM unit can be applied:

  $Q_h = 9.43\ kW \times 0.99 =$ **9.33 kW**

- **Step 3: Calculation for the heating capacity of the combination (YUTAKI M unit + electric heater)**

  Once the corresponding correction factors are applied, the actual heating capacity provided by the RASM-5VNE unit is 9.33 kW. This heating capacity does not cover the required heating load for the coldest days (13.5 kW).

  In these cases, the electric water heater supplied by HITACHI as an accessory (WEH-6E) is to provide the auxiliary capacity required to cover exceptional heating needs.

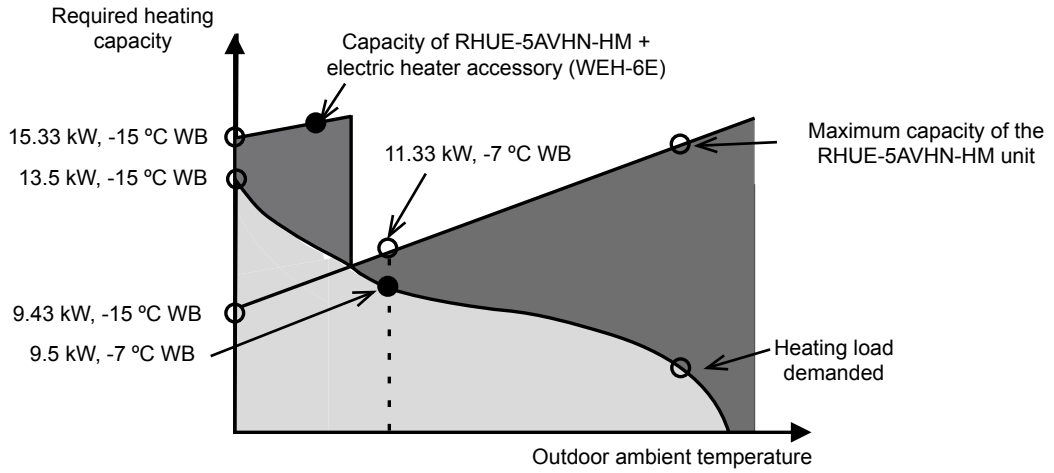
  The electric heater offered by HITACHI as an accessory provides a power of 6 kW, which must be added to the heating capacity provided by the preselected unit.
  The result is:

  Qh= 9.33 kW + 6kW = 15.33 kW

NOTE

The heating capacity resulting from the combination (YUTAKI M unit + electric heater) is higher than the heating demand of 13.5 kW estimated in this example for the coldest days of the year, and so the preselection of the RHUE-5AVHN-HM unit is considered valid.

The resulting energy system is as follows:



c) Selection of the domestic hot water tank accessory

The domestic hot water tank accessory corresponding to the selected YUTAKI M system is either DHWT-200S-3.0H2E or DHWT-300S-3.0H2E, depending on the water demand and the combination method. The daily water demand is estimated with the following calculation formula for consumption:

$$D_i(T) = D_i(60ºC) \times (60-T_i / T-T_i)$$

Where:

$D_i(T)$: ***Water demand at T temperature***

$D_i(60ºC)$: ***Domestic hot water demand at 60 ºC***

T: ***Temperature of the domestic hot water tank***

T_i: ***Temperature of the inlet cold water***

- Calculation of ***$D_i(60 ºC)$***:

  The standard consumption, expressed in daily litres per person and determined by technical installation regulations of each country, is used to calculate the domestic hot water demand at 60 ºC, ***Di(60 ºC)***. This quantity is then multiplied by the expected number of users in the installation. In the following example, the domestic hot water demand at 60 ºC has been considered as 30 litres per person, in a detached house with 4 residents (3 bedrooms).

- Calculation of ***T***:

  The temperature of the domestic hot water tank is an estimation referred to the temperature of the accumulated water inside the tank, prior to operation. The temperature is usually in the range between 45 ºC and 65 ºC. It has been considered as 45 ºC in this example.

- Calculation of ***Ti***:

The temperature of the inlet cold water refers to the temperature of the water being supplied to the tank. This temperature is in the range between 10 ºC and 15 ºC. 12 ºC is used in this example to calculate an approximate water demand.

- Example:

$D_i(T)$= 120 x (60-12 / 45-12) = ***174.6 litres/day***

174.6 x 2(*) = ***349.2 litres/day*** *approximate demand of hot water*

NOTE

(*) It is recommended to multiply the calculated consumption by two, in case that the installation is in a detached house. This is done to ensure a steady supply of hot water. In the case of a multifamily installation, it is not necessary to increase the forecast of hot water demand, given the lower simultaneity factor.

Therefore, a 300 litre tank is recommended when the system is a combination with RASM-4VNE or higher, in order to ensure a longer supply of hot water and a better system performance. In case that the conditions of demand are lower than those specifications, a tank with a capacity 200 litres can be selected, depending on the demand conditions. A table with the selection of domestic hot water (DHW) tanks recommended by HITACHI for the different existing combinations is shown below:

YUTAKI M system	Domestic hot water tank
RASM-3VNE	DHWT-200S-3.0H2E DHWT-300S-3.0H2E
RASM-4(V)NE	DHWT-300S-3.0H2E
RASM-5(V)NE	
RASM-6(V)NE	

NOTE

- *The YUTAKI S80 system is designed for combination with a HITACHI domestic hot water tank. In case that another tank is being used in combination with a YUTAKI S80 system, HITACHI cannot guarantee the proper operation or reliability of the system.*
- *This procedure for selection of a domestic hot water tank is merely illustrative; please refer to the applicable local regulations in order to ensure a proper water demand value.*

◆ Cooling mode (as an option, adding the cooling kit accessory and the setting for cooling mode)

Procedure description

Upon verification that the selected system (monoenergy) is able to cover all the heating needs, it is necessary to perform the same check for cooling mode, in order to obtain the cooling capacity of the system.

- **Step 1: Initial preselection**

Inlet/outlet water temperature	23/18 ºC
Ambient temperature DB	35 °C
Required cooling load	14.5 kW

Installation restrictions	
Installation type	Refreshing floor

These conditions determine the position in the Maximum cooling capacity tables, (See section *"4.6.2 Maximum cooling capacity table (kW)"*), where it can be confirmed whether the preselected unit for heating mode can provide the cooling load required by the installation (10.5 kW for an inlet/outlet water temperature of 23/18 ºC and an ambient temperature of 30 ºC DB).

YUTAKI S COMBI system	Maximum cooling capacity (kW)
RASM-5VNE	16.0

The RASM-5VNE system provides a theoretical cooling capacity (16.0 kW) greater than the cooling load required by the installation (10.5 kW). Therefore, the calculation process can continue.

NOTE

If the unit being preselected for heating mode does not provide the cooling load required by the installation, then preselection shall be changed by choosing the immediately higher unit.

- **Step 2: Correction of cooling capacity for defrost and piping length**

The actual cooling capacity of the preselected unit must be calculated applying the necessary correction factors:

$$Q_C = Q_{MC} \times f_{LC}$$

Q_C: Actual cooling capacity (kW)

Q_{MC}: Maximum cooling capacity (kW)

f_{LC}: Correction factor for cooling piping length

The maximum cooling capacity (Q_{MC}) of the RASM-5VNE system is 16.0 kW.

- Calculation of f_{LC}:

To determine this value, it is necessary to refer to section *"Cooling piping length correction factor"*. In the example shown in this chapter (equivalent piping length of 20 metres, with the indoor unit placed 15 metres lower than the outdoor unit), the resulting correction factor for cooling piping length becomes **0.976**, approximately.

- Calculation of Q_C:

Once the correction factors to be applied have been determined, the formula for actual cooling capacity of the RAS-4WHVNPE + RWD-4.0NWE-200S system can be applied:

$Q_C = 16.0\ kW \times 0.976 =$ ***15.62 kW***

The actual cooling capacity of the RAS-4WHVNPE + RWD-4.0NWE-200S system (15.62 kW) is greater than the cooling load required by the installation (14.5 kW). Therefore, the preselection is considered valid for both heating and cooling.

NOTE

If the calculated actual cooling capacity is lower than that provided by the preselected unit, the calculation must be done again with the immediately higher unit.

4.1.3 Flow rate and pressure drop check

- **Step 1: Calculation of the flow rate required for the circulation pump**

  The following formula is used to calculate the required pumping flow in order to provide a heating capacity, producing an increase in the difference of temperature between water inlet and water outlet, depending on the requested heating capacity.

$$CFR = \frac{Q_h \times f_{gf} \times 860}{1000 \times (T_S - T_E)}$$

  CFR: Calculated flow rate (m^3/h)

  Q_h: Actual heating capacity (kW)

  f_{gf}: Correction factor of flow rate owing to use of glycol

  (T_S - T_E): Difference in temperature between water inlet and water outlet (°C)

  NOTE

  Calculation of f_{gf}: Once the actual heating capacity and the difference between the water inlet and water outlet temperatures are known, the value required to calculate the pump flow rate is the flow correction factor due to the use of glycol f_{gf}. The use of glycol affects the actual heating capacity, since the density of glycol is higher than that of water. Therefore, a higher flow rate is necessary for the same conditions. To calculate the flow rate correction factor owing to the use of glycol, please see the table in section "4.7.2 Correction factor owing to use of glycol (only for YUTAKI M)", bearing in mind the type of glycol used.

- **Step 2: Verification of the working limits of the flow on the water circulating pump**

  Once the flow needed for the pump has been determined, it must be verified whether is lies within the working limits of the unit. Refer to the *"6. Working range"* chapter, where the maximum and minimum flow for each YUTAKI unit can be found.

- **Step 3: Calculation of the necessary pressure to be provided by the circulating pump**

  The circulating pump must be able to provide the pressure required to make up for the pressure loss in the hydraulic unit installation at the client's side, working with the previously calculated flow.

  The section *"6.3.2 Pump performance curves"* contains operation details of the YUTAKI models. The data needed are the pressure losses from the hydraulic unit installation at the client's side and have been estimated as given by the following formula:

$$P = K \times Q^2$$

  P: Loss of pressure on the client's hydraulic installation (mH2O)

  Q: Pump flow rate of circulating water (m^3/h)

  K: Coefficient depending on the characteristics of the hydraulic installation (diameter and length of pipes, roughness, etc.).

  Check whether the selected units cover the pressure drop for the circulating flow rate in the *"6.3.2 Pump performance curves"* section, and install an additional pump in the client's hydraulic installation if necessary.

  CAUTION

  The use of glycol affect to the reading of some parameters like "water flow level" and "capacity" shown through the unit controller menu. When glycol is used, these data are not correct and must be not used.

4.2 System selection procedure (by Selection Software)

4.2.1 Introduction

Hi-ToolKit for Home is a HITACHI software product that has been especially designed for professionals working in the field of individual home heating.

More than just a software product used for selecting air-to-water heat pumps, Hi-ToolKit for Home is a genuine technical and financial tool. In just a few clicks, Hi-ToolKit for Home allows the creation of a general technical and financial proposal for an end-user customer, which can be used as a complement to a quote issued by a professional.

Hi-Toolkit for Home software guarantees the selection that best fits the customer's needs, among HITACHI heat pumps.

It is already available in all hardware platforms (PC, Smartphone, Tablets).



4.2.2 How to use the Selection Software

The following is a brief explanation on the usage of the Hi-ToolKit software. The contents are common for the entire range of YUTAKI units from HITACHI (YUTAKI S, YUTAKI S COMBI, YUTAKI S80 and YUTAKI M).

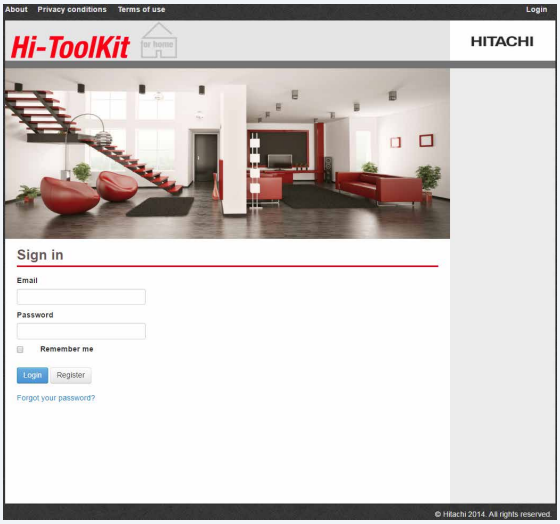
The Hi-ToolKit software is an online web application, which can be used in all major computer platforms (Windows, MacOS, Linux), without the need to install any piece of software. The most popular web browsers are supported on their latest versions.

The Selection Software can be accessed from any of the following URLs:

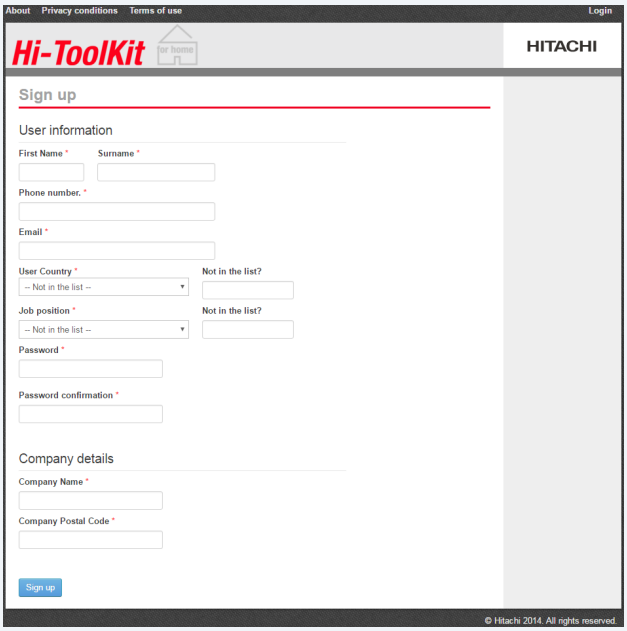
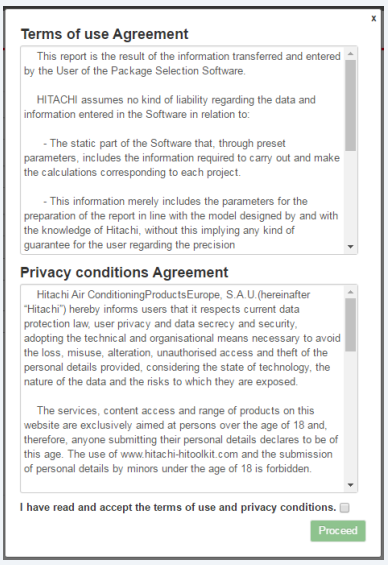
http://hitachi-hitoolkit.com/heating/users/login

http://www.hi-toolkit.com/forhome/

◆ Main screen

The first time that Hi-ToolKit for Home software is used, it is necessary to register by entering an e-mail and password.	

◆ Register

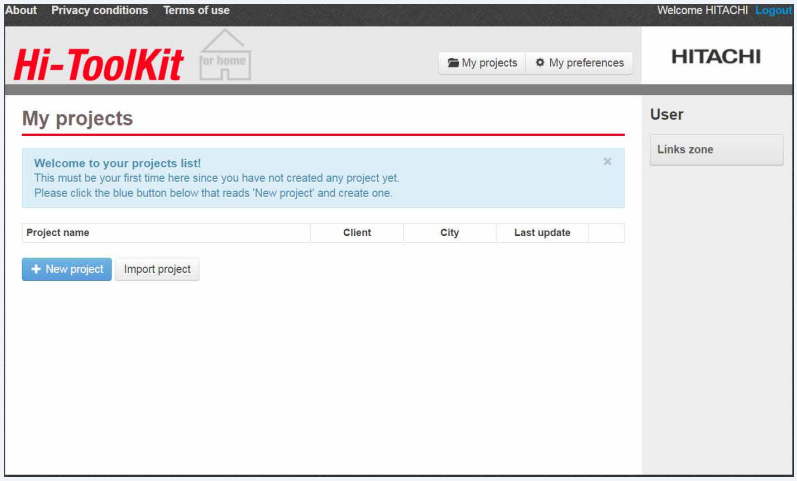
Complete all user information, and after completes, click “Sign up” and you will be prompted to accept the “Terms of use Agreement”.	
The “Terms of Use Agreement” appear when new user has been registered. It shows the general conditions of using the software. Please read and understand prior to accept these conditions. To continue to the following steps, accept the conditions and click Proceed.	
When the conditions are accepted, Hi-toolkit platform sends a confirmation mail to the new user. Click to “Confirm my account”	Welcome *no-reply@hitachi-hitoolkit.com* Confirm the account email through the received link: *Confirm my account*

◆ Main tab

After Register & Log-in screens, Hi-tool kit main screen is shown.

In the first starting, it can be selected one of the following list of options:

- Start new project: This will take you to create a completely new project
- Import project: This will open a existing project created out of the user.
- My preferences: This opens the setting preferences for the user (and it will be used for all projects)



◆ My preferences

The “My Preferences” screen consists of several options, to define various settings that apply to all Hi-toolKit projects. “My Preferences” has been created in two parts:

1 Installation preferences: All options related with installations issues. Use of the room thermostat, price of the units, price of electricity, gas, fuel...

2 User preferences: All options related with user issues. Different unit measures, change software language, setting of the user...

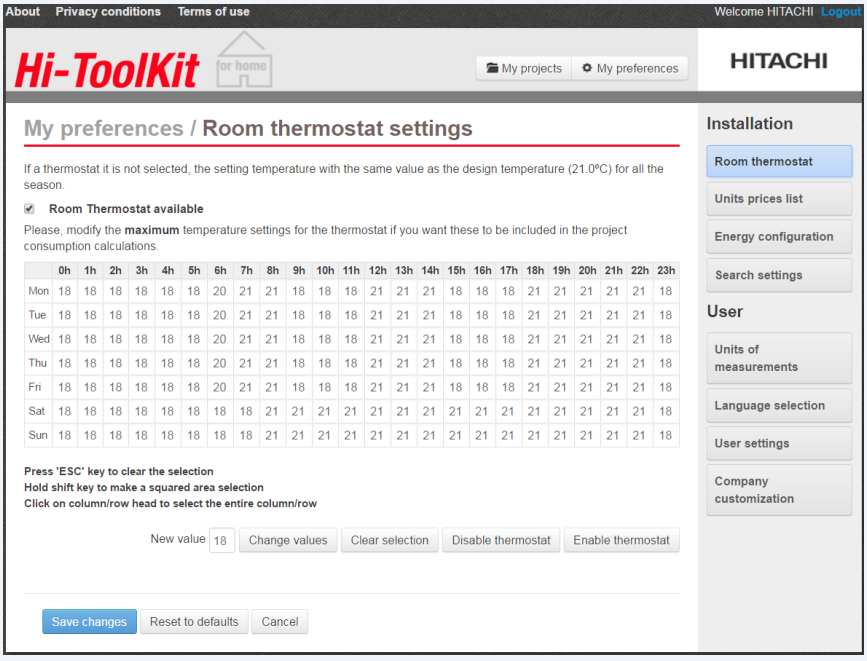
1. Installation preferences

Room thermostat

HI-Toolkit selection software assumes that design room temperature is 21ºC, however Room thermostat can be selected.

YUTAKI room thermostat has weekly timer function in order to change automatically the setting room temperature. This value is taken into account in the calculation.

Default value is the factory default setting.

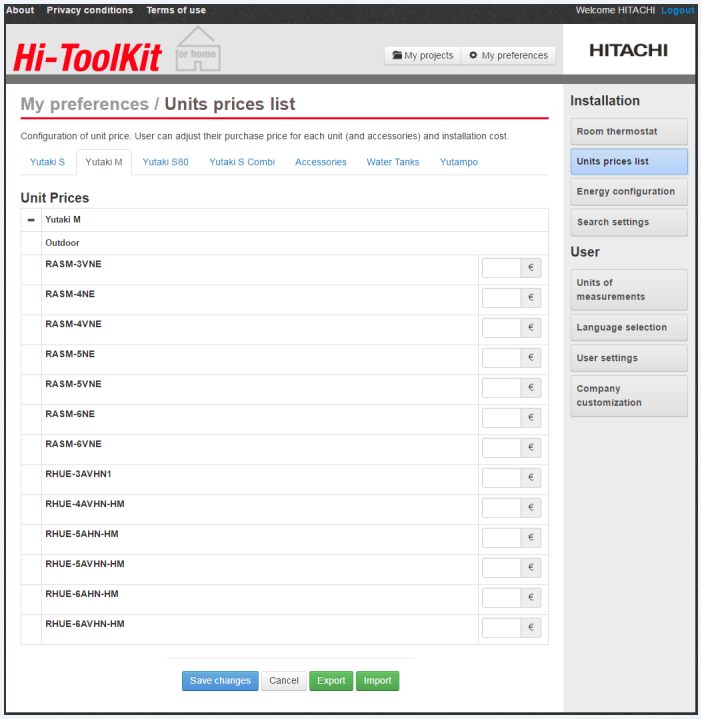


Unit prices list

Defines the prices of the all units supplied by HITACHI that are possible to use with HI-toolkit for Home.

Here, the price of the different units can be introduced, and it will be shown after in the final report.

It is possible to enter a price list file by using IMPORT button or export price list file by using EXPORT button.



Energy Configuration - Electricity Price (1)

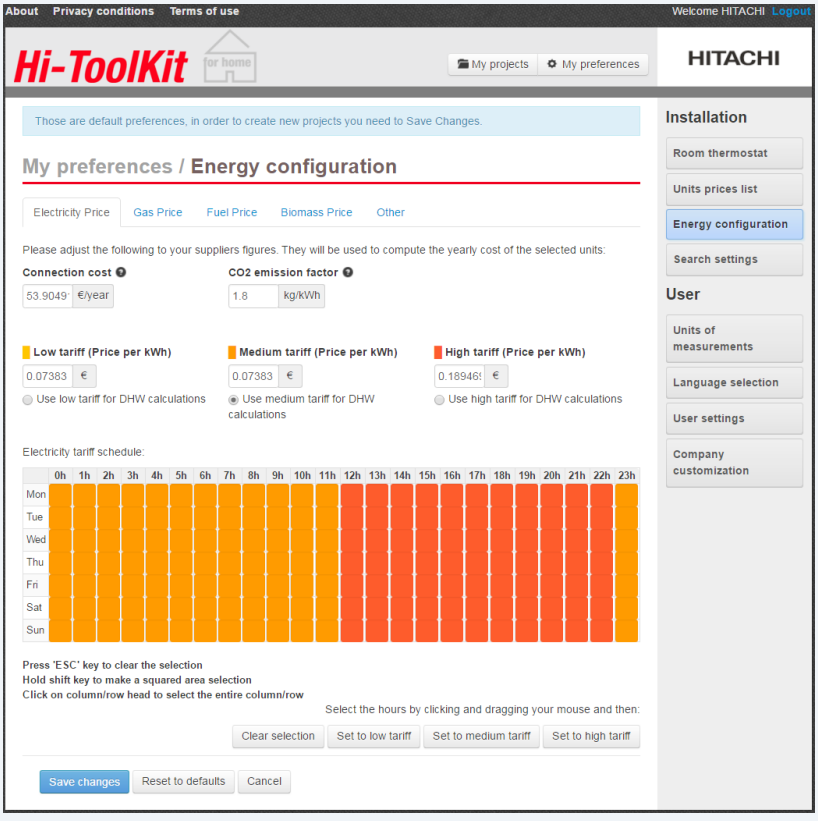
Connection cost: Corresponding price of electricity connection (is not used for calculation).

CO2 emission factor: Corresponding CO2 emissions factor by using electricity.

Tariff: The electricity price for the projects can be selected between high prices, medium and low price per kWh.

- Low tariff (Price per kWh): Price of electricity by using low tariff application.
- Medium tariff (Price per kWh): Price of electricity by using medium tariff application.
- High tariff (Price per kWh): Price of electricity by using high tariff application.

The “Reset to defaults” button returns to the original values for Hi-ToolKit software.



Energy Configuration - Electricity Price (2)

Electricity tariff schedule: allows to make a schedule to apply a tariff for every hour of every day of the week.

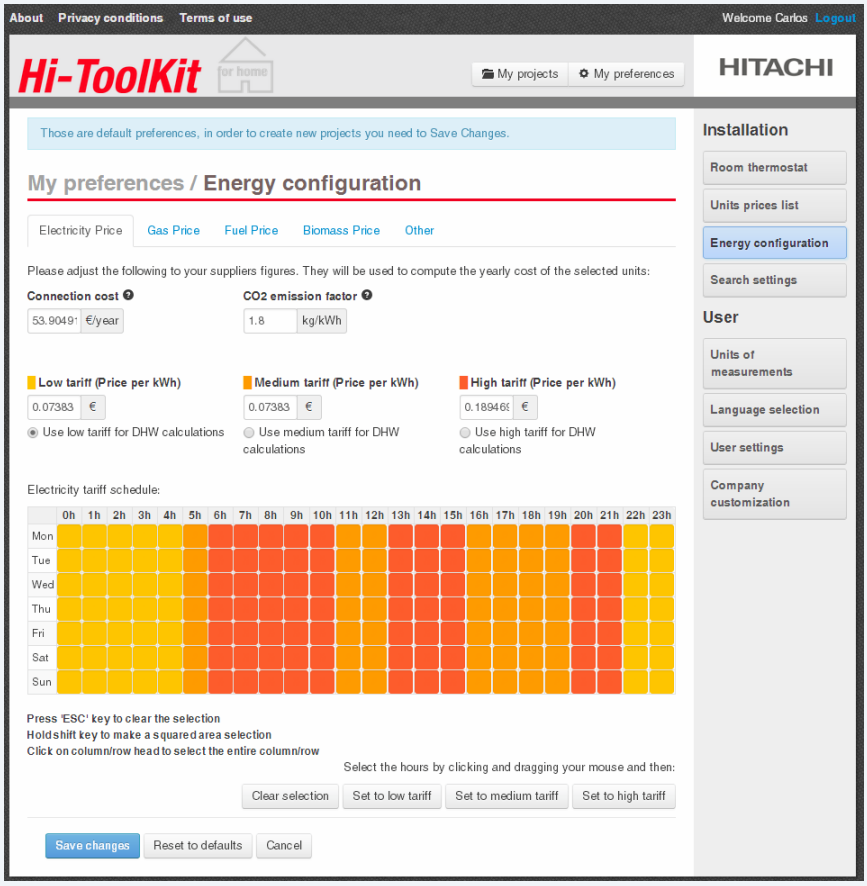
Select the hour/s and day/s and apply the tariff clicking in the appropriate button of tariff (Set low/medium/high Tariff)

If you click on the hour cell, is selected the same hour for all the days of the week.

If you click day, is selected all hours of the selected day.

In the example, the three tariff conditions (low/medium/high) are shown for

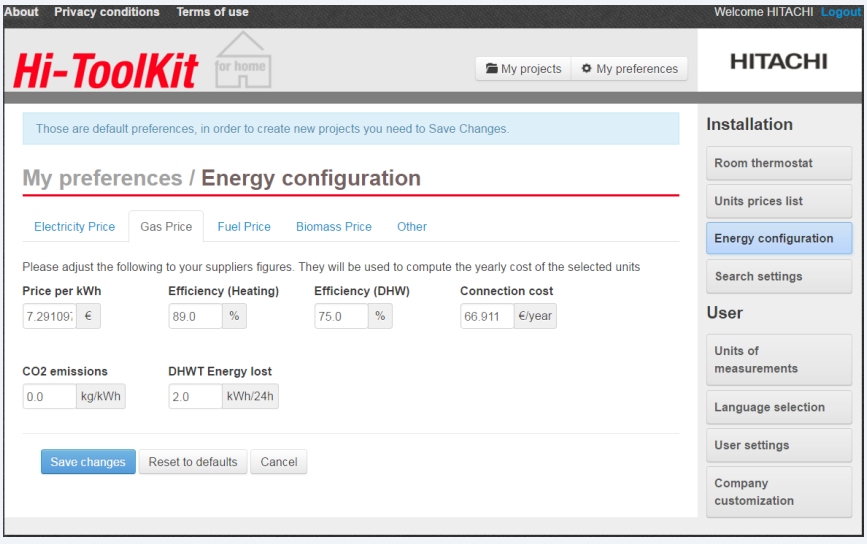
- Low tariff:
  00h~04h & 22h~23h
- Medium tariff:
  05h & 11h~12h & 16h~19h
- High tariff:
  06h~10h & 13h~15h & 20h~21h



Energy Configuration - Gas Price

In the final report, HITACHI solution can be compared with other gas, fuel or biomass boiler applications. To make it possible, all fields of the other solutions must be filled with the detailed information.

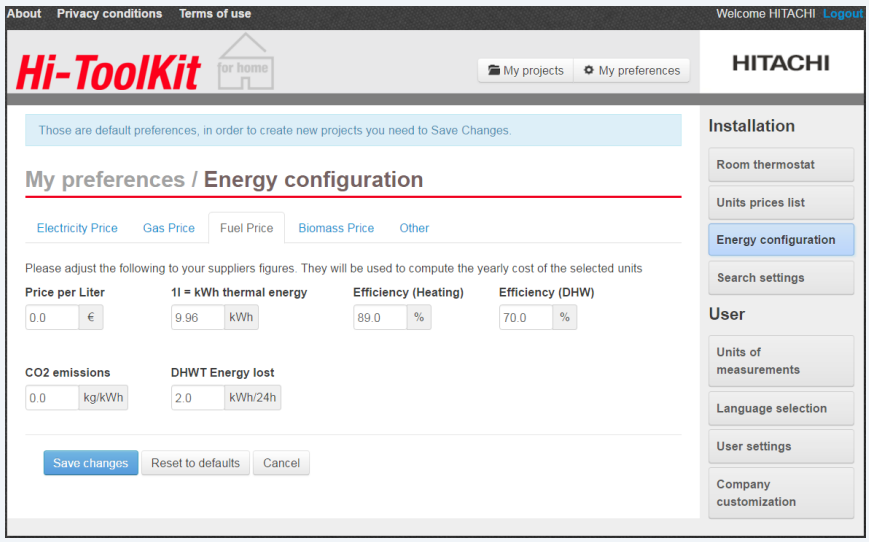
The “Reset to defaults” button select the original values for Hi-ToolKit software.



Energy Configuration - Fuel Price

In the final report, HITACHI solution can be compared with other gas, fuel or biomass boiler applications. To make it possible, all fields of the other solutions must be filled with the detailed information.

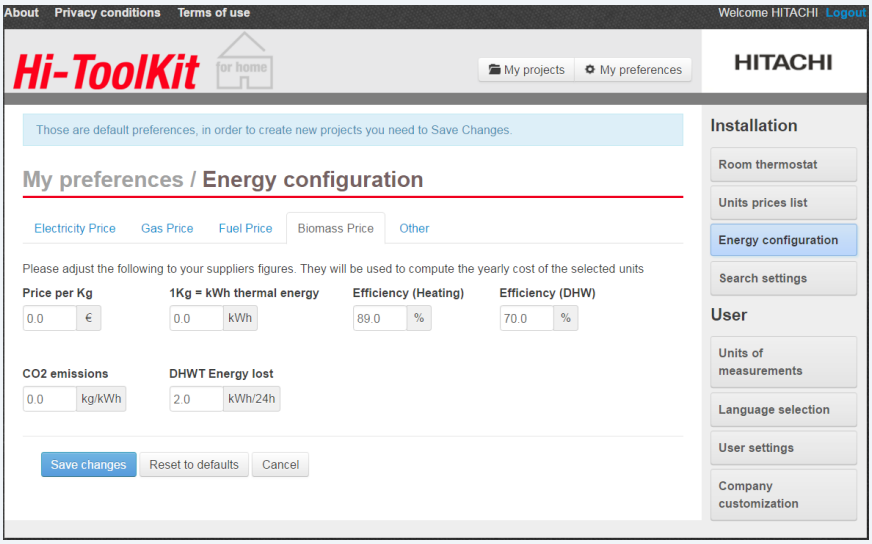
The “Reset to defaults” button select the original values for Hi-ToolKit software.



Energy Configuration - Biomass Price

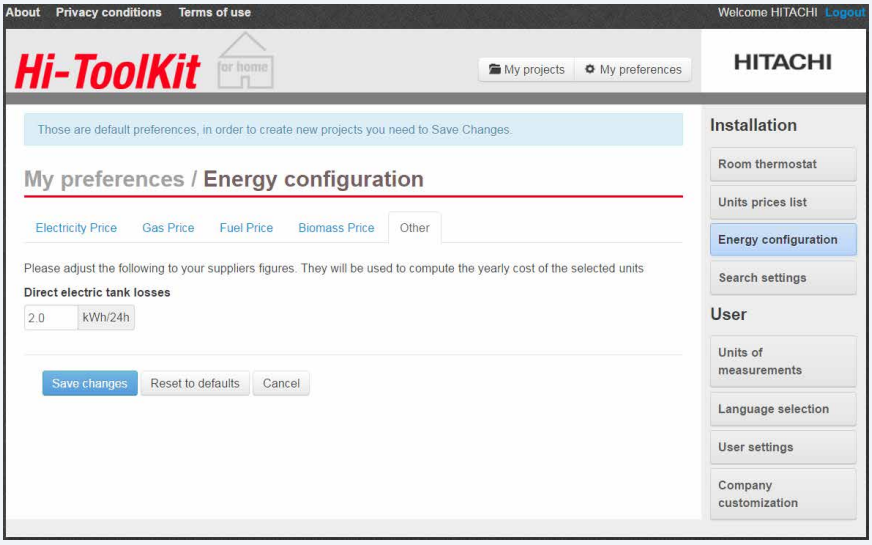
In the final report, HITACHI solution can be compared with other gas, fuel or biomass boiler applications. To make it possible, all fields of the other solutions must be filled with the detailed information.

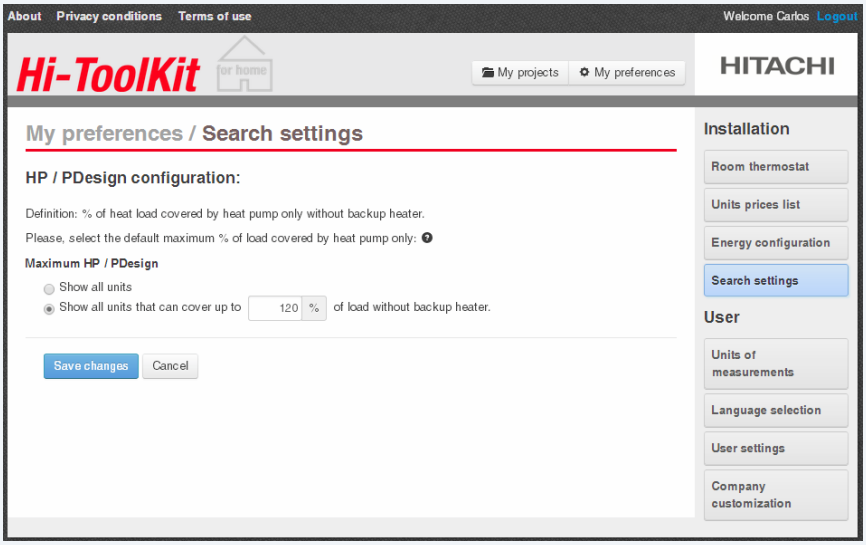
The “Reset to defaults” button select the original values for Hi-ToolKit software.



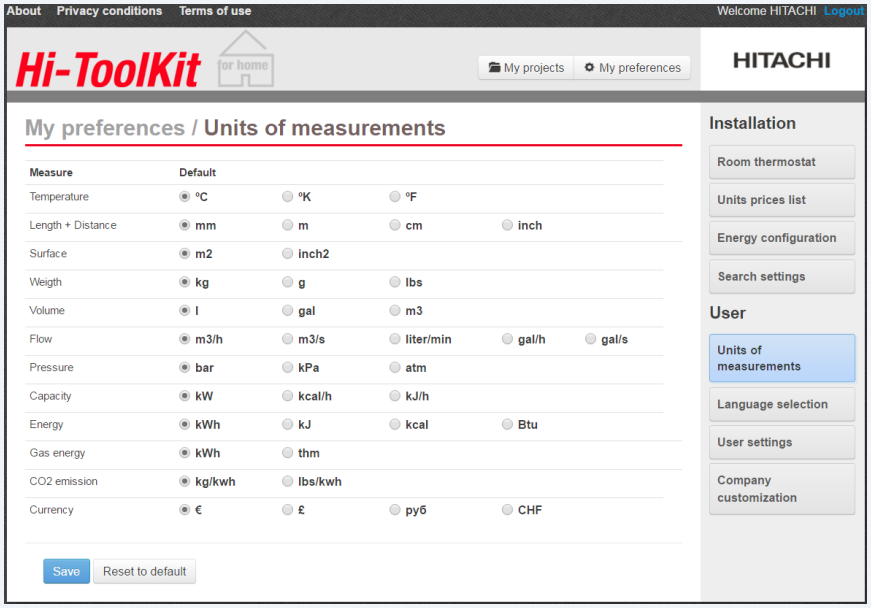
Energy Configuration - Other

In this screen; the direct electric tank losses can be set.



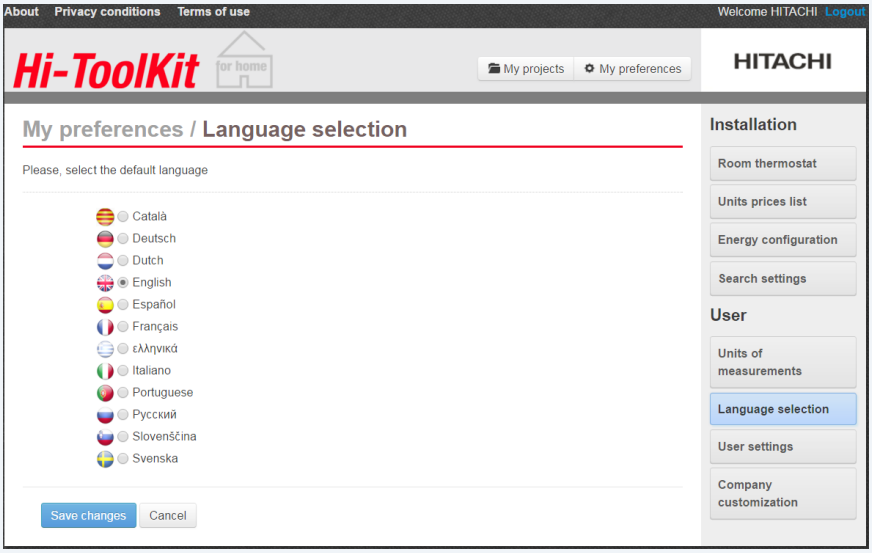
Search settings	
In this screen, it is possible to select the following options: • To display all the units. • To display only those units which are able to cover up to a determined percentage of load without the use of back-up heater.	

2. User preferences

Units of measurements	
By Default, HI-toolKit uses the International system of measures to express all the data. However, all the units can be set. The “Reset to defaults” button select the original values for Hi-ToolKit software.	

Language selection

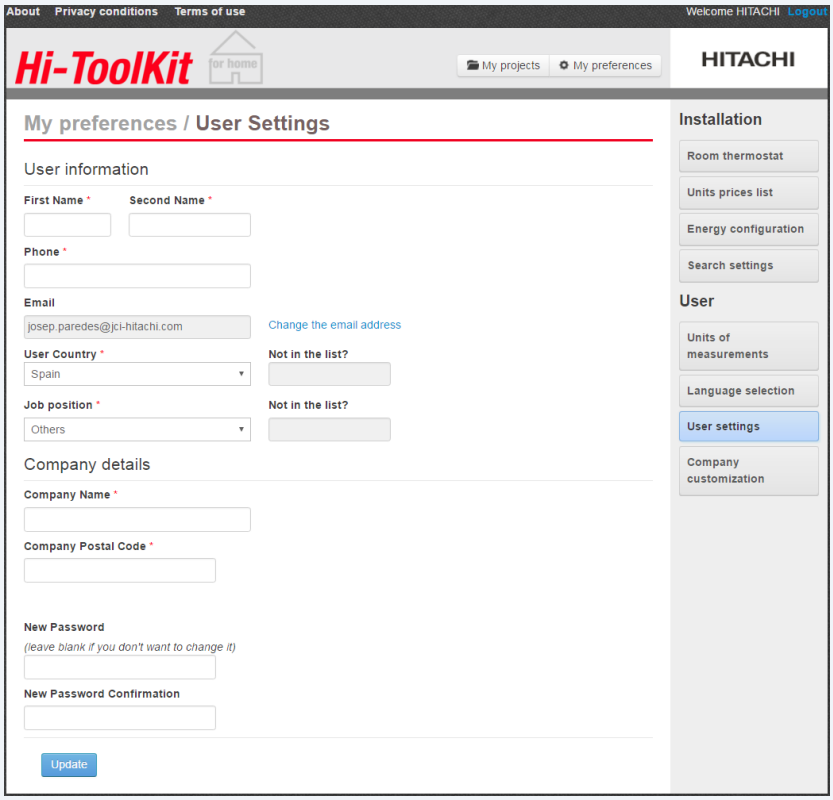
By using online web tool, default language of the software is automatically selected by user location; however, it is also possible to use other languages available in the list.

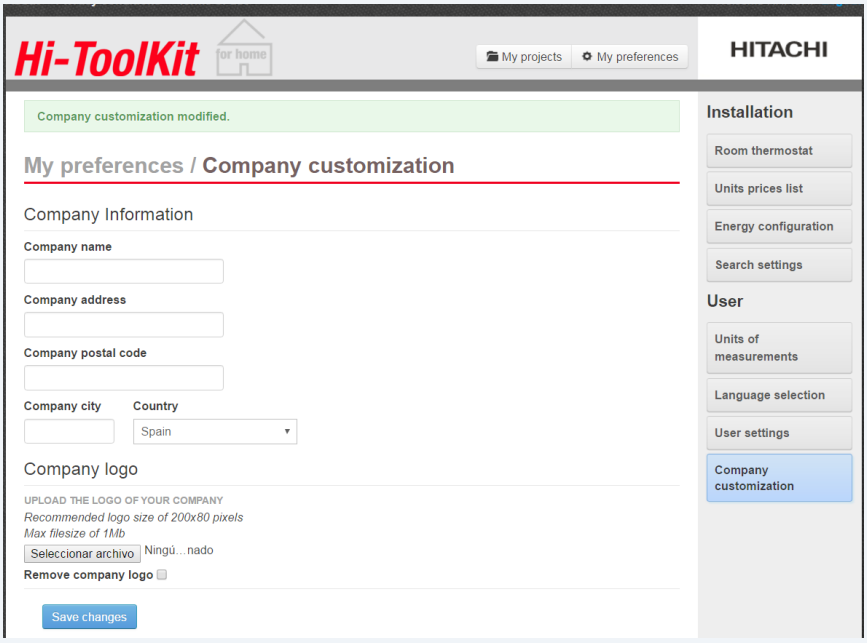


User settings

The user setting will appear allowing the edition of the user preferences.

All data except the Email can be changed.



Company customization	
A company name and logo can also be used and then it will be shown on the final reports.	

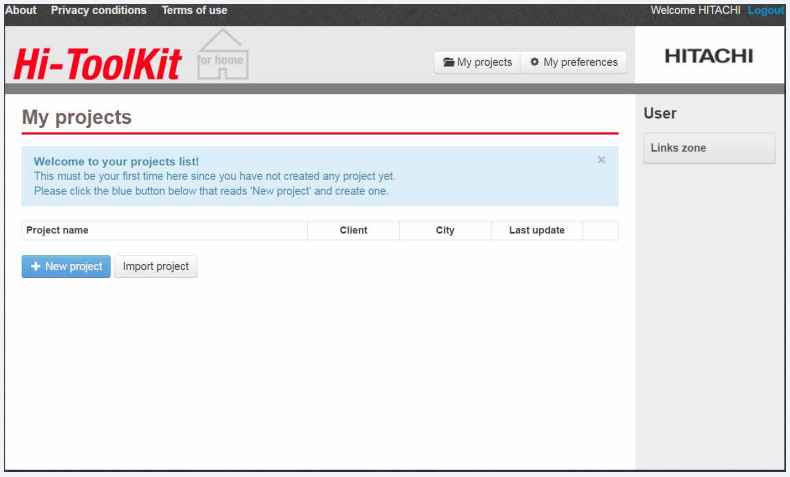
◆ Start new project

A new project can be performed in only 8 steps, then the final report with the selected unit will be shown. Additionally, the progress of the project is visible in any moment in the menu side.

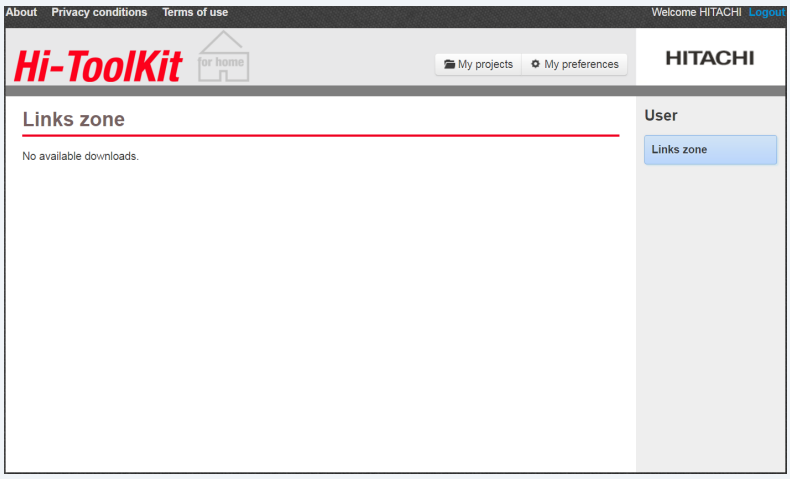


STEP 1	Define information of the new project and customer side.
STEP 2	Define installation criteria's, installation application, type of unit, power supply, etc..)
STEP 3	Define design criteria's: Installation location, heating capacity, water temperature range, etc.…
STEP 4	If the DHW option has been activated, the daily pattern of hot water consumption and the DHW tank size can be selected
STEP 5	After installation and design configuration, Hi-toolkit find the range of unit available.
STEP 6	The wide range of heating accessories is displayed and these accessories which best fit in the heating system can be selected
STEP 7	When user select his best the unit, Hi-toolkit produce an extra information by different kind of graphs..
STEP 8	User can print a professional report

If no project is created, click the “New Project” button.



In the “link zone”, accessible clicking in the button “link zone”, there is the available download



4

STEP 1: Project Data

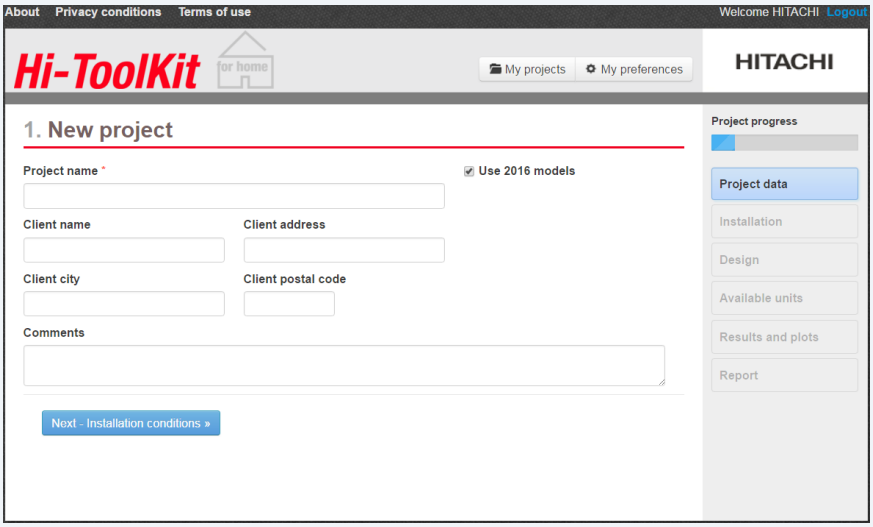
Complete all the information. This information is used to save the project and to show it in the final report.

- Project name (required field)
- Client name
- Client address
- Client city
- Client postal code
- Comments: Extra comments that could be added.

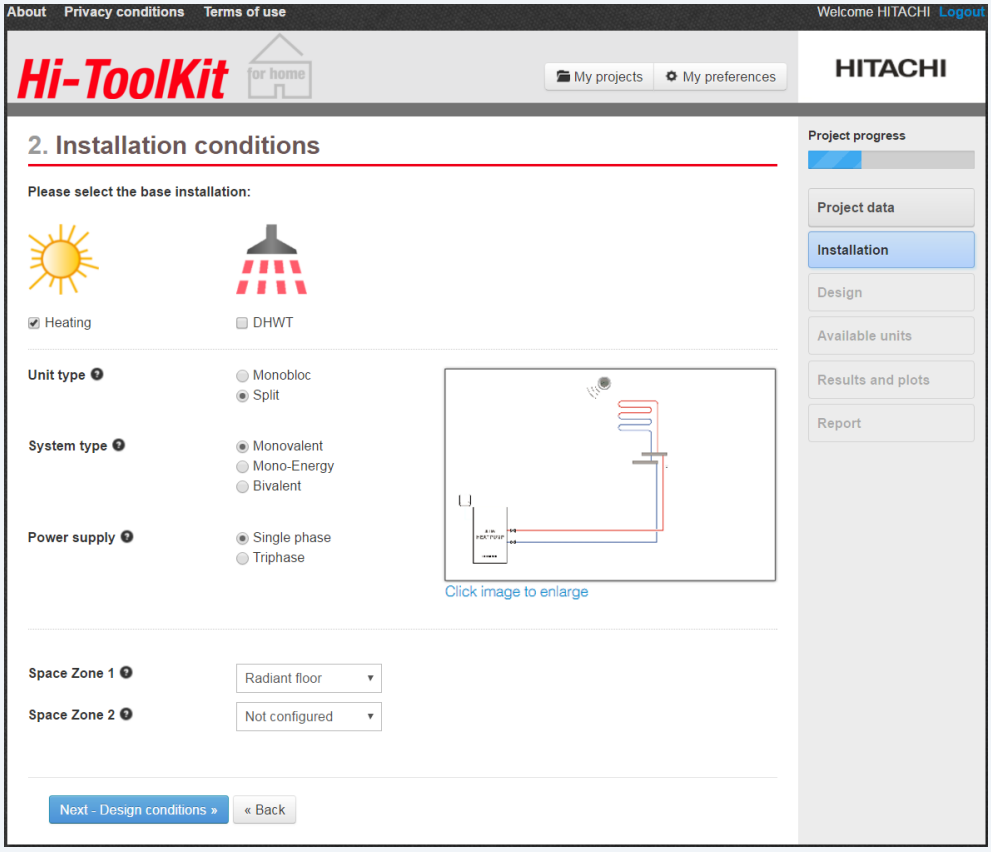
Once completed, click to “Next – Installation conditions” button.

NOTE

By default, software is using 2016 models only. If older units are needed, uncheck the “Use 2016 models” box.



STEP 2: Installation (1)



In step 2, the installation criteria's (installation application, type of unit, system type, power supply, etc.) must be decided.

Hi-ToolKit selects those parts into a basic configuration in order to define the best solution, then it shows the proposed hydraulic scheme. An enlarged image of the selected hydraulic circuit will be shown.

- Installation base: By using tick box, the proposed installation can be defined.
  - Heating: The heating of the installation is performed by the heat pump.
  - DHWT: Each heat pump system has a water tank, some of which are optional, depending on the solution found. When a water tank is selected, an extra tab appears to fill in the water tank selection.
- Unit Type: There are two type of unit depending on the composition:
  - Monobloc: Units composed by a single outdoor unit, which includes the hydraulic cycle.
  - Split: split unit are divided in two unit, the internal hydraulic unit and external inverter unit.

(Please note that when Split unit type is selected, the displayed image corresponds always to YUTAKI S system. The purpose is not to show the type of unit, the purpose is to illustrate the difference between monobloc and split systems).

- System Type: System type defines if an auxiliary source to cover the heating demand is selected.
  - Monovalent: The heat pump is sized to cover the 100% of the heating requirements.
  - Mono-Energy: The heat pump is sized to cover the 80% of the heating requirements. An auxiliary electric heater is used to provide the additional heating required on the coldest days of the year.
  - Bivalent: A boiler is configured to alternate with the air to water heat pump on the coldest days of the year.
- Power supply: The power supply defines the available power source at the customer side.
  - Single phase: One-phase power supply (1~ 230V 50Hz)
  - Thriphase: 3-phases power supply with neutral connection (3N~ 400V 50Hz)
- Space Zone 1: Definition of the installation type of the space heating zone 1.
  - Radiant Floor: Low temperature application.
  - Radiators/Fan coils: Medium/High temperature application.
- Space Zone 2: Definition of the installation type of the space heating zone 2.

Once completed, click to "Next –Design conditions " button.

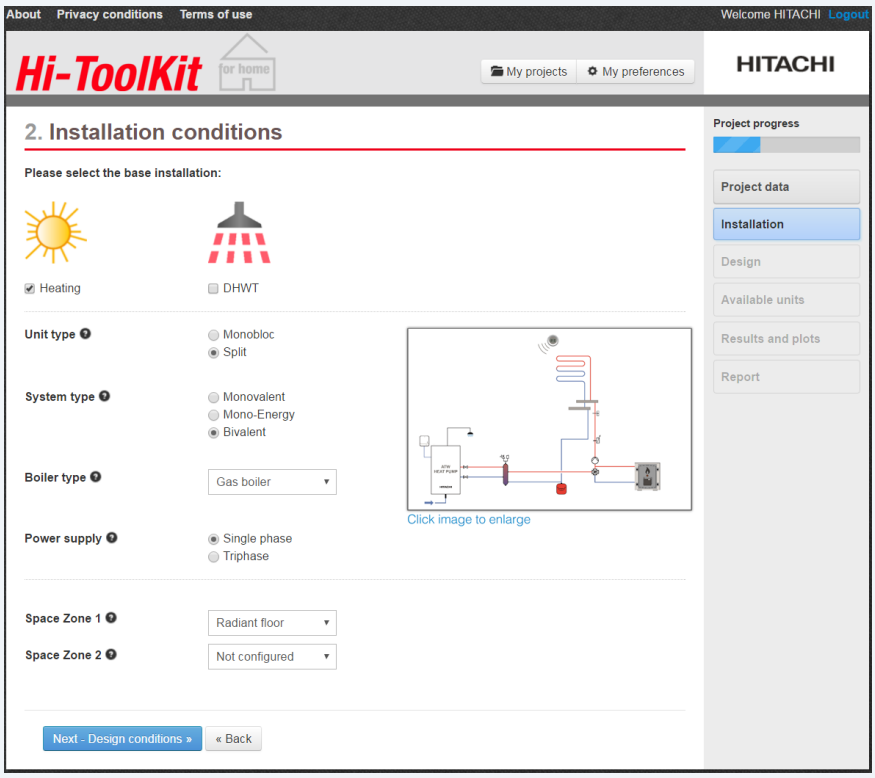
STEP 2: Installation (2)

If System type selected is Bivalent, one of the following types of boiler shall be selected:

- Gas Boiler
- Oil Fuel Boiler
- Biomass boiler

Remember to set the “Energy configuration” in Installation preferences for the selected boiler.

Once completed, click to “Next – Design conditions” button.



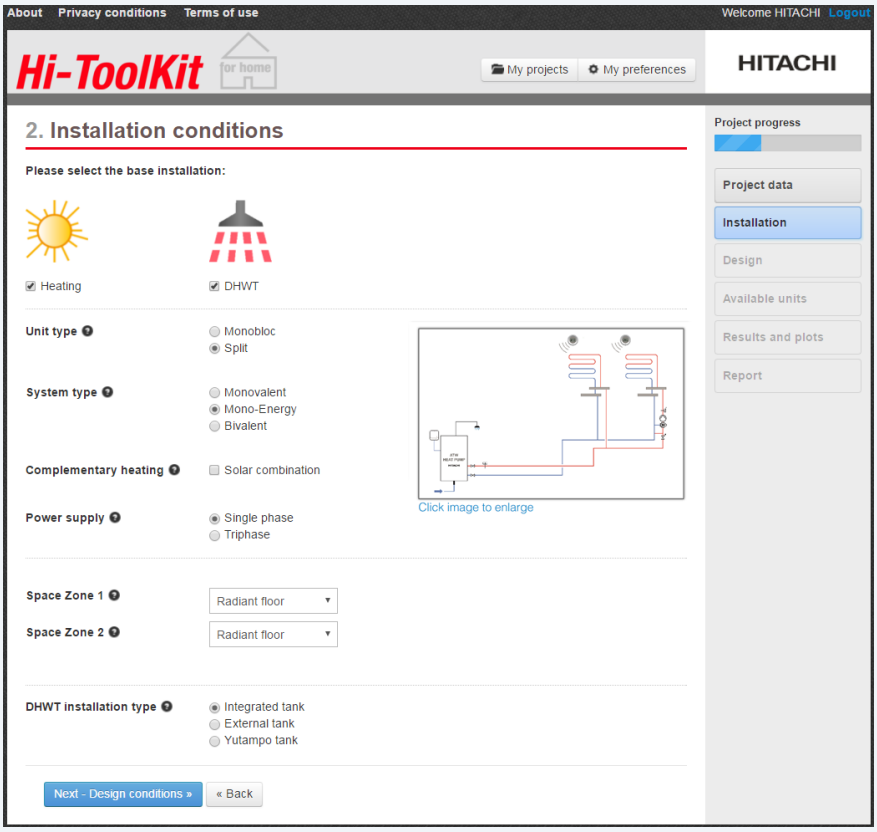
STEP 2: Installation (3)

Each heat pump system has a water tank, some of which are optional, depending on the solution found. When a water tank is selected, an extra tab appears to fill in the water tank selection.

The following types of tank are available to combine with heating systems:

- DHWT installation type:
  - Integrated tank
  - External tank
  - Yutampo tank

Once completed, click to “Next –Design conditions” button.

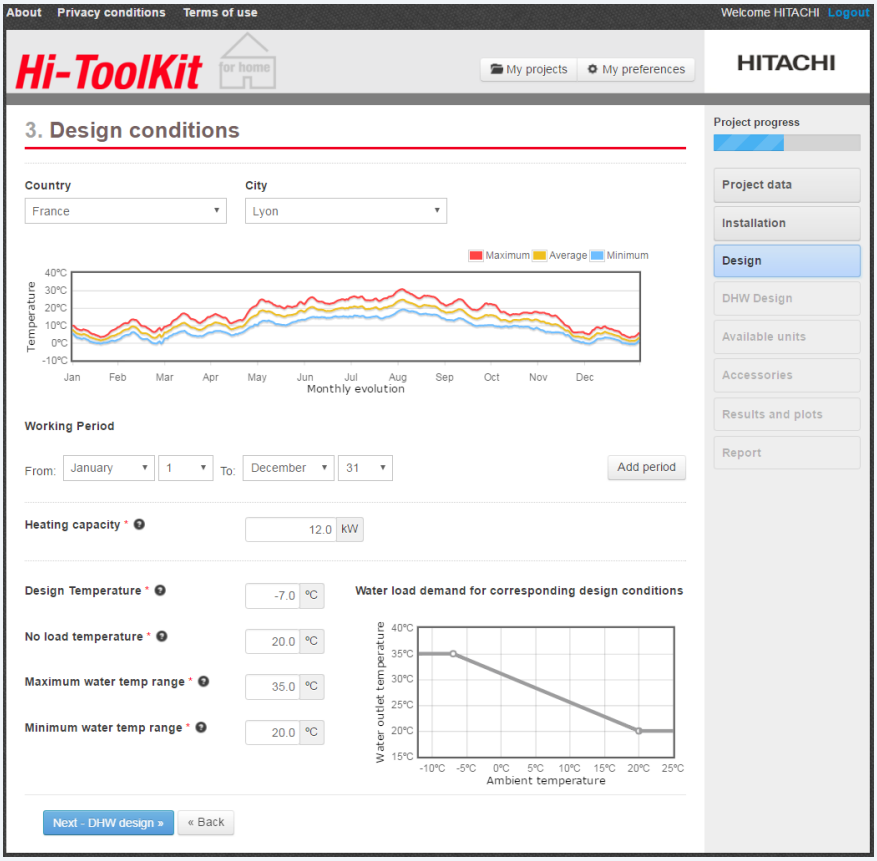


STEP 3: Design (1)

Define design criteria's: Installation location, heating capacity, water temperature range, etc.

- Country and City: When selecting a location, a climate with temperature data for each hour of the year is automatically selected.
- Working period: The heating working period can be selected for different ranges.
- Heating capacity: Required heating capacity to cover all the required load at design temperature.
- Design temperature: Lower outdoor temperature used to design the installation. By default, it is get from the climate data location.
- No load temperature: The heating operation is stopped above this temperature (Min: 12ºC, Max: 20ºC).
- Maximum water temperature range: Maximum temperature limit of the installation. This value is taken into account for calculation and for the definition of the water rules.
- Minimum water temperature range: Minimum temperature limit of the installation. This value is taken into account for calculation and for the definition of the water rules.

Once completed, click to "Next – DHW design" button.

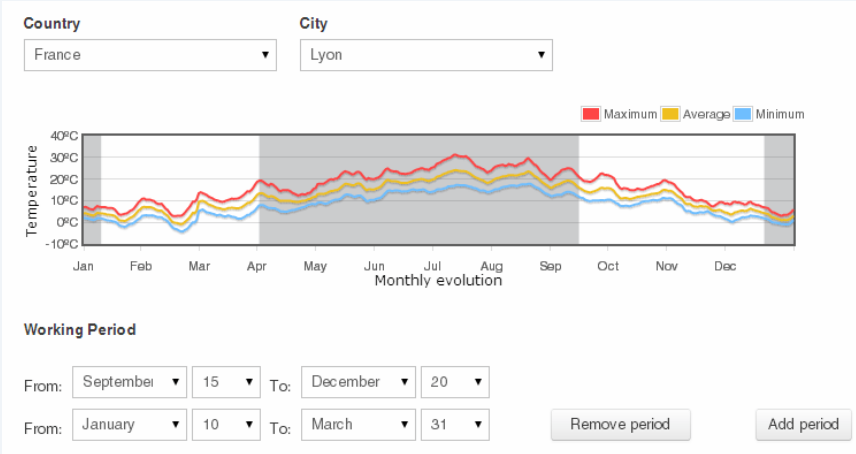


STEP 3: Design (2)

Example of Working period assignation:

- Heating from: 15th September to 20th December and 10th January to 31 March
- No Heating from: 21th December to 9th January (Christmas Holydays)

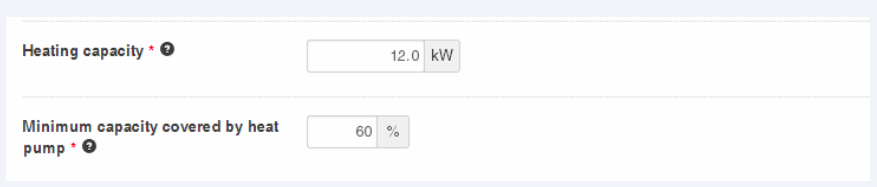
Once completed, click to "Next – DHW design" button.



STEP 3: Design (3)

When the installation conditions selected in "STEP 2: Installation" are Mono-Energy or Bivalent combination, a minimum percentage of the heating capacity covered by the heat pump shall be defined.

Once completed, click to "Next – DHW design" button.



STEP 4: DHW Design

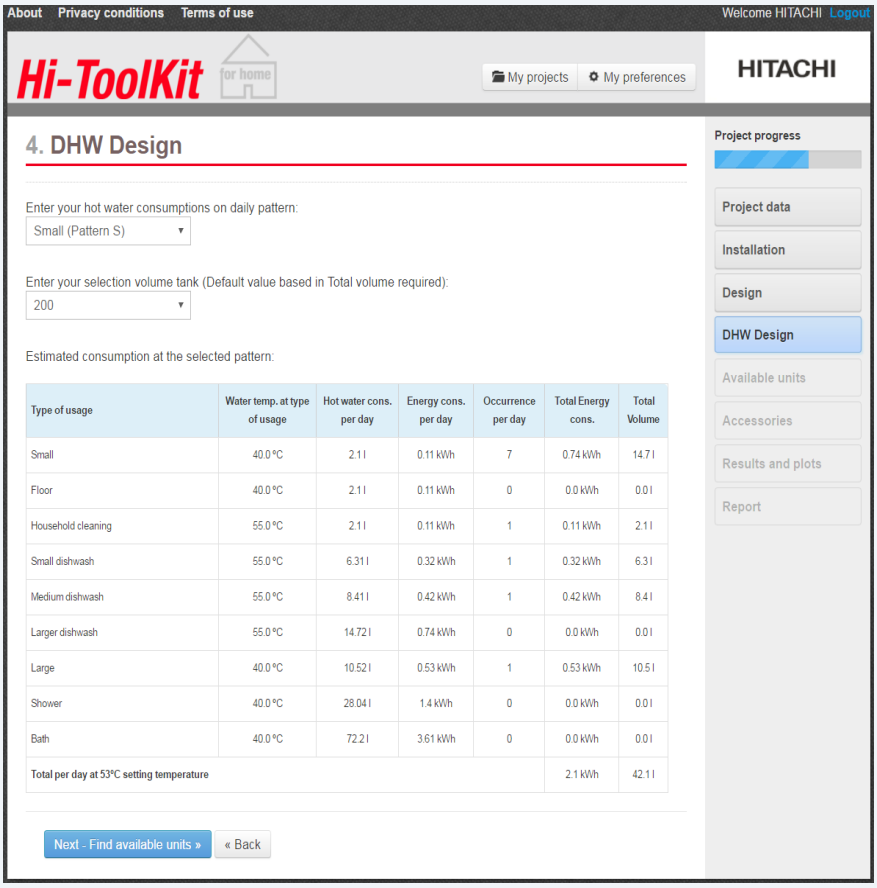
If the DHW option has been activated the daily pattern of hot water consumption and the DHW tank size can be selected.

Hot water consumption on daily pattern:

- Small (Pattern S)
- 2 people (Pattern M)
- Family (Pattern L)
- Big family (Pattern XL)
- Custom

Tanks water volume:

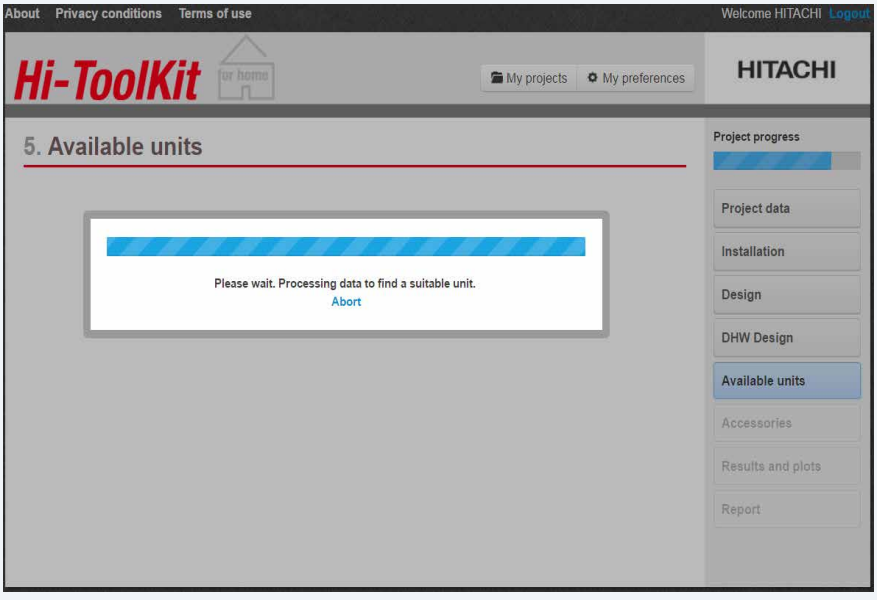
- 200 L
- 260 L



STEP 5: Available units (1)

After Installation and Design condition have been designed, Hi-ToolKit start to search the most suitable units.

Note: The process could take 10 to 20 seconds depending on the selected conditions.

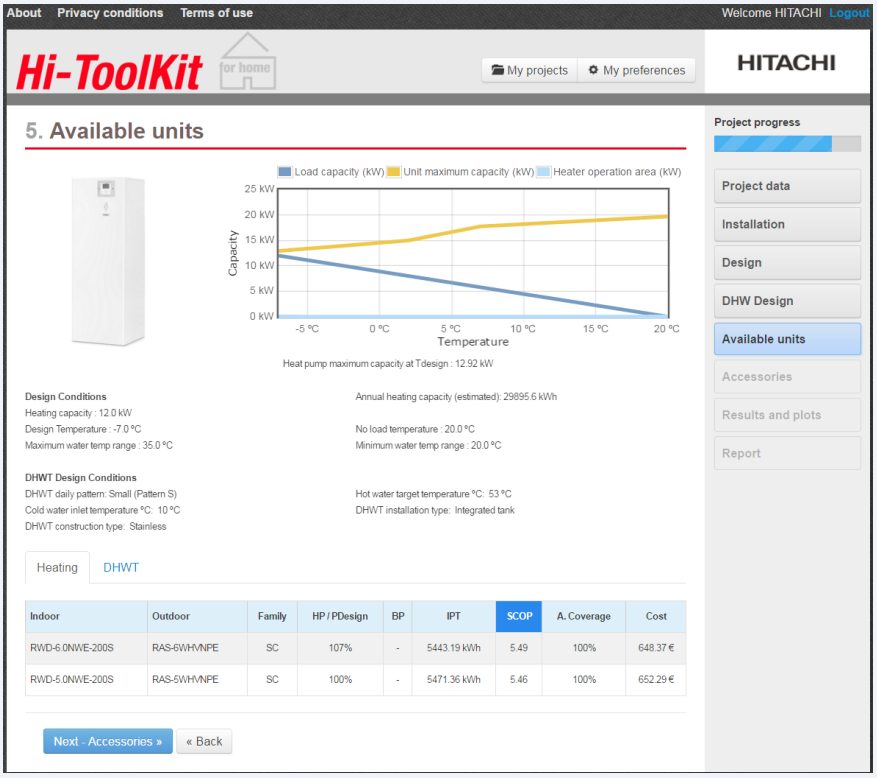


STEP 5: Available units (2)

The Hi-ToolKit software selects the best YUTAKI systems using an inner simulation to get solutions which cover all installation and design conditions by using a weather database during a year, after that, the Hi-ToolKit software shows a wide variety of data:

- Total thermal energy (Capacity)
- Input power (IPT)
- Total energy consumption (by Heat pump and booster heater if available)
- Seasonal coefficient of performance (SCOP)
- Etc.

Once the unit has been selected, click to “Next - Accessories” button.



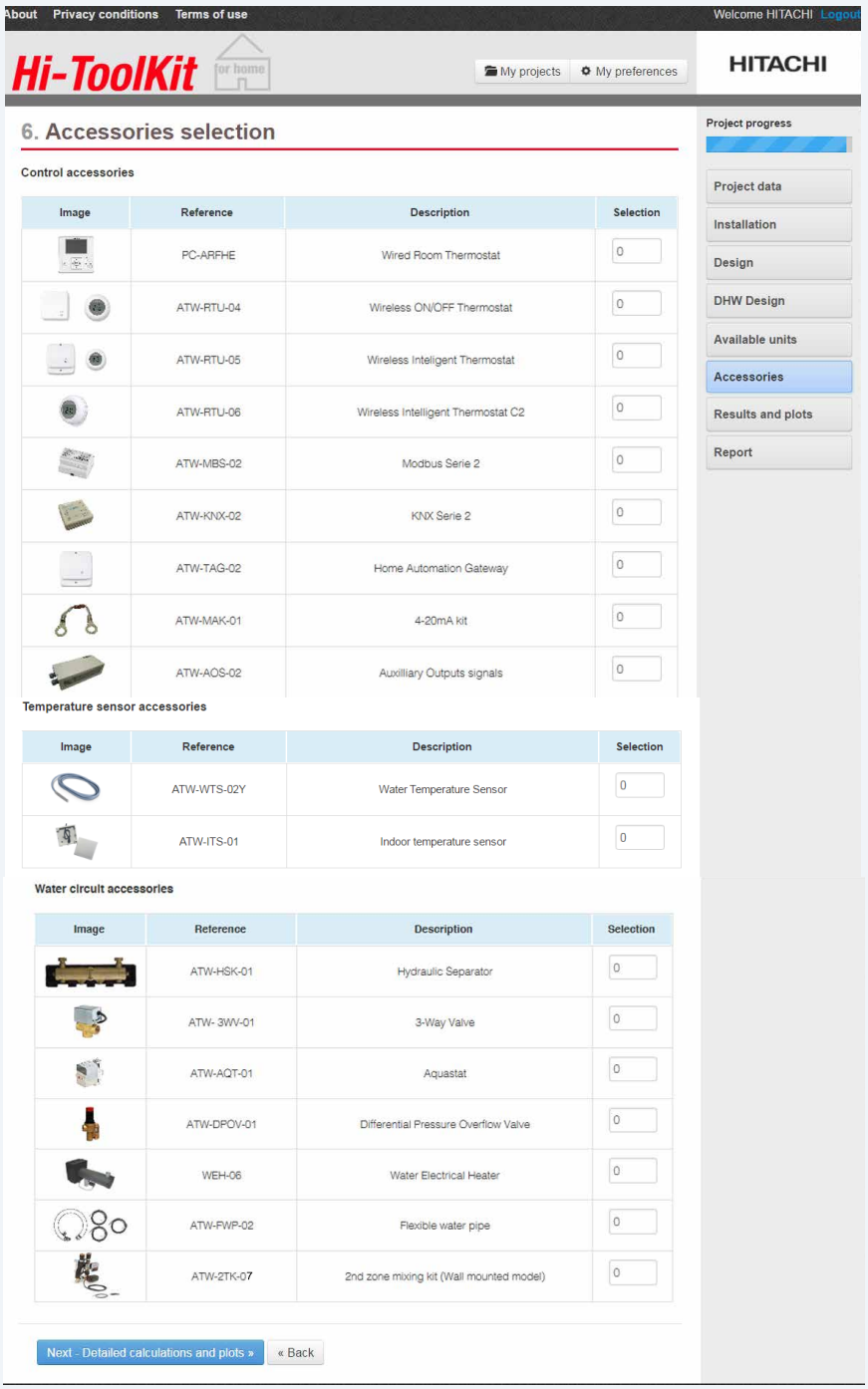
STEP 6: Accessories selection

In this screen, the heating accessories which best fit in your system can be selected between 3 main groups:

Control accessories

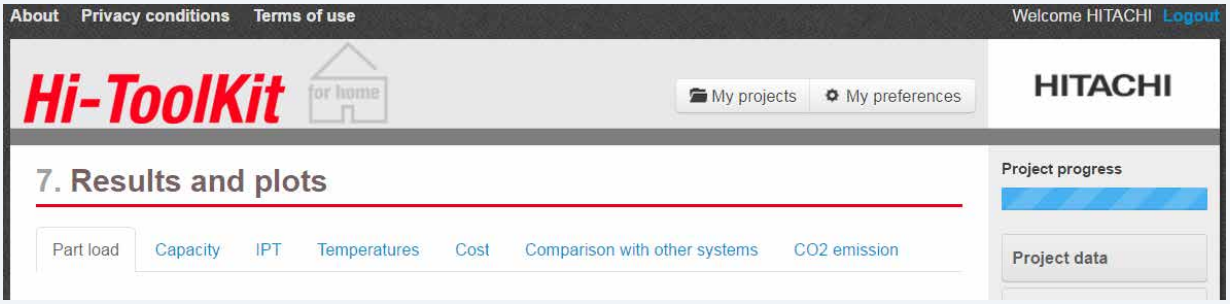
Temperature sensor accessories

Water circuit accessories

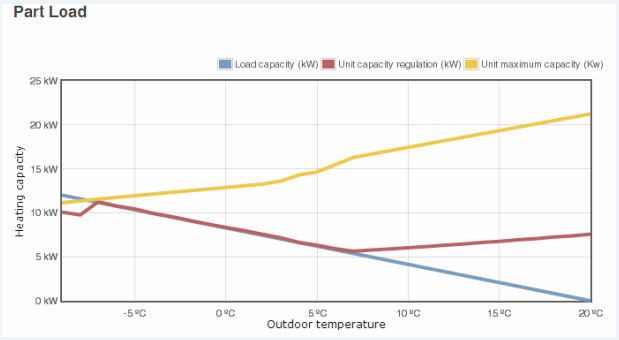


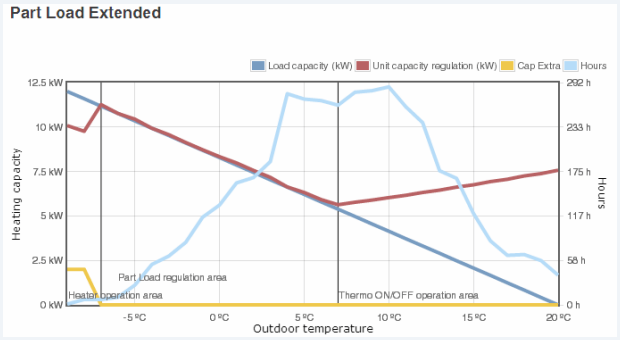
STEP 7: Results and plots

When the best unit has been selected, the Hi-toolkit software produces extra information through different kind of graphs and explanations:

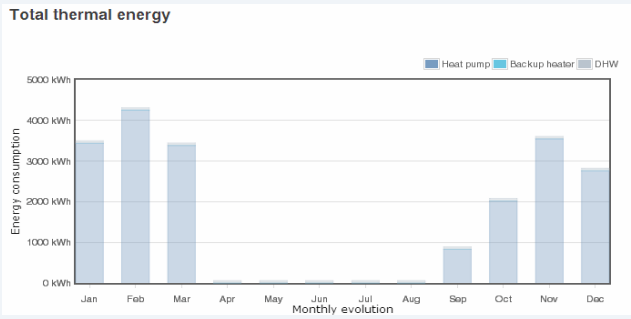


Part load unit regulation (kWh): Heating demand and heating capacity of the unit (in regulation and maximum).

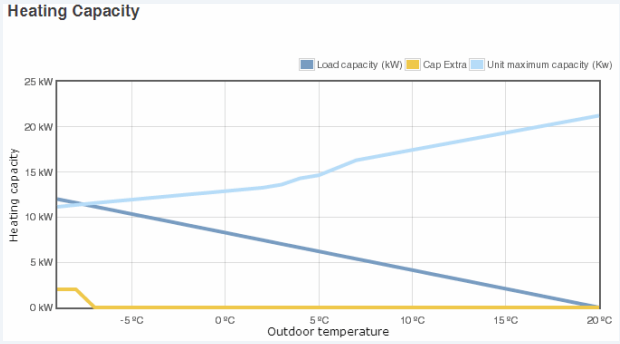




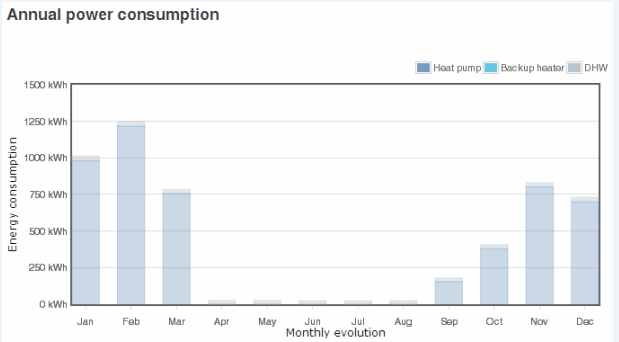
Total Thermal Energy (kWh): Heating total thermal energy of the installation per month.



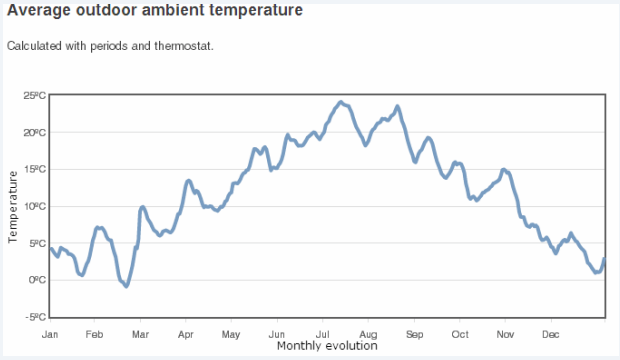
Heating Unit Maximum Capacity (kWh): Heating demand and maximum heating capacity of the unit.



Annual Power consumption (kWh): Annual power electric consumption per month.

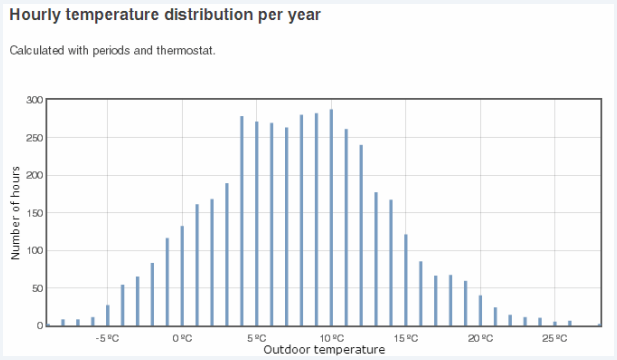


Average outdoor ambient temperature (ºC): Ambient average temperature into the selected location.

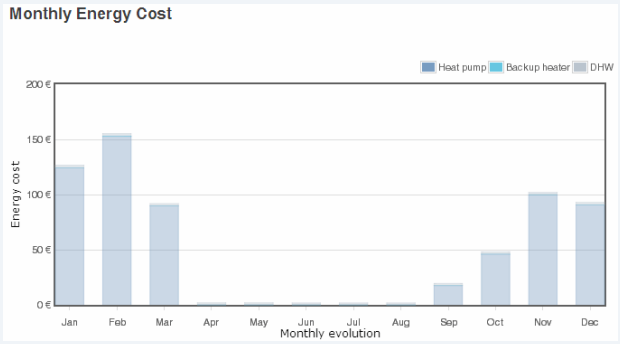


STEP 7: Results and plots

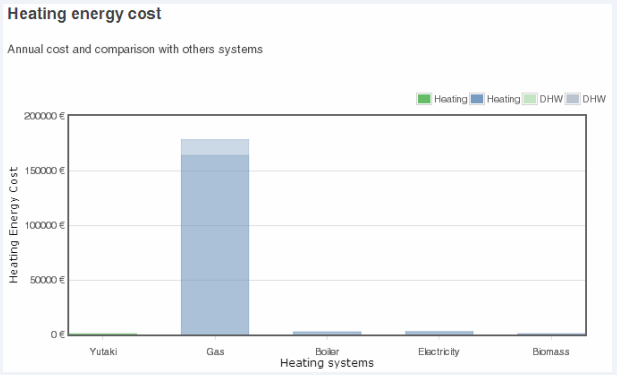
Hourly temperature distribution per year (hours): Number of hours per temperature during the year in the selected location.



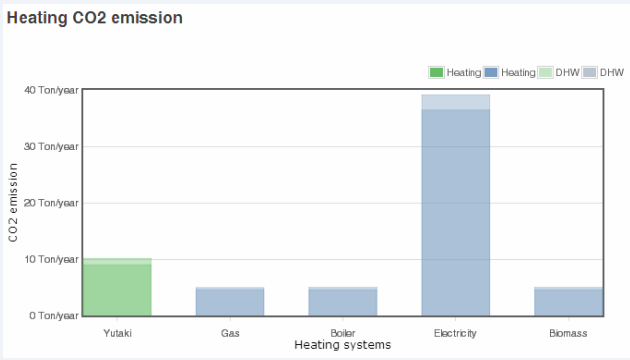
Monthly Energy Cost (€): Total energy cost per month of the YUTAKI unit of the heating installation.



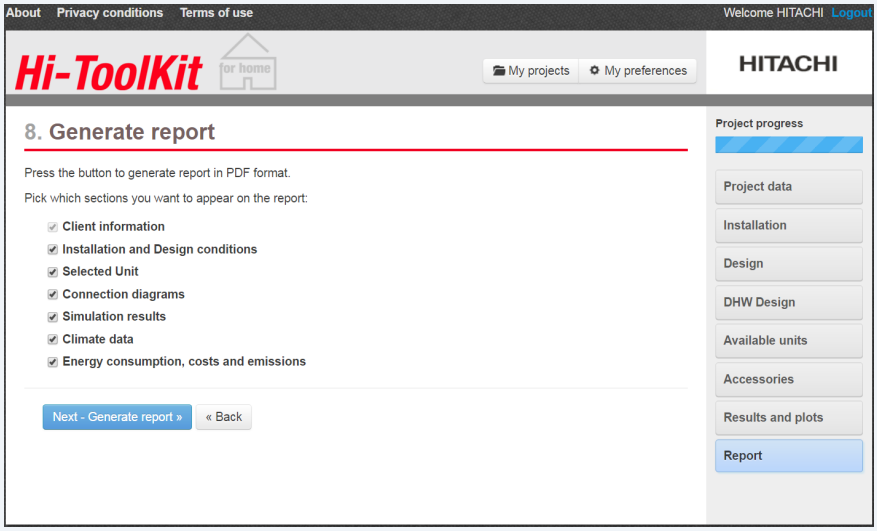
Annual energy cost comparison (€): Simulated annual cost of YUTAKI unit in comparison with Fuel, Gas, Biomass and direct electricity units.



Heating CO2 emission (Ton/year): The CO2 emission of the different energy sources is displayed.



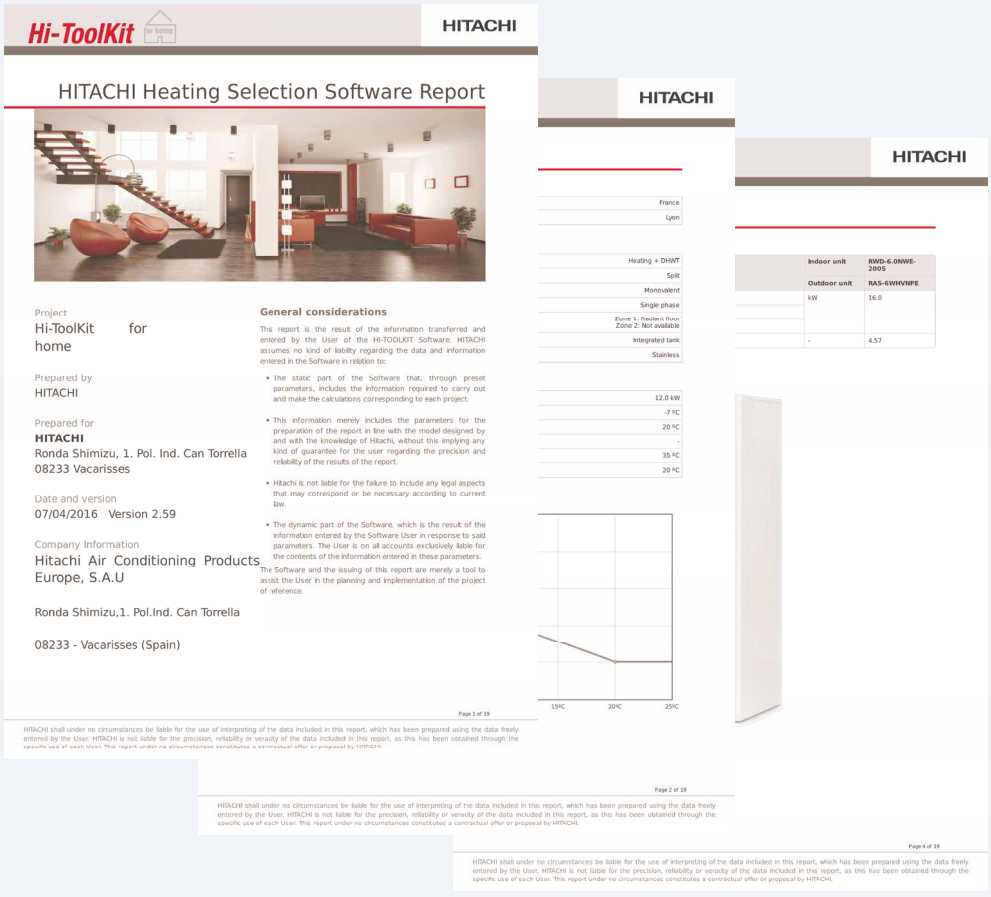
STEP 8: Report (1)



Finally, the information which will be shown in the final report can be decided between the following list:

- Client information: All the information from the customer (It always is shown).
- Installation and design conditions: All the information from installation and design conditions selected.
- Selected units: Technical information of YUTAKI system selected and material list needed for the installation.
- Connection diagrams: Hydraulic and electrical connection schemes.
- Simulation results: All the information of capacity, input, graphics, etc.
- Climate data: All information of climate database for the location selected.
- Energy consumption, cost and emissions: All the information of capacity, input, graphics, etc.
- Field settings: All settings on the YUTAKI system, which needs to be performed in the commissioning by selection criteria.

STEP 8: Report (2)



4.3 YUTAKI S

4.3.1 Maximum heating capacity table (kW) (Integrated)

System	Water outlet temp (ºC)	Ambient temperature (ºC WB)																			
		-20		-15		-10		-7		-2		2		7		12		15		20	
		CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)
RAS-2WHVNP + RWM-2.0NE(-W)	60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	55	-	-	-	-	3.80	2.24	4.20	2.27	4.30	1.98	4.60	1.84	6.00	2.22	6.90	2.16	7.50	1.98	8.50	1.69
	50	-	-	-	-	4.02	2.08	4.41	2.10	4.45	1.88	4.70	1.78	6.10	2.65	7.05	1.94	7.65	1.84	8.70	1.68
	45	-	-	4.00	2.22	4.38	2.08	4.60	1.99	4.70	1.81	4.80	1.71	6.20	1.82	7.10	1.69	7.70	1.68	8.90	1.71
	40	-	-	4.25	2.09	4.51	1.95	4.66	1.87	4.93	1.73	5.15	1.62	6.60	1.69	7.55	1.52	8.16	1.50	9.20	1.46
	35	-	-	4.50	1.96	4.64	1.82	4.70	1.73	5.16	1.62	5.50	1.53	7.00	1.56	8.00	1.36	8.40	1.28	9.70	1.26
	30	-	-	4.70	1.96	5.20	1.92	5.50	1.90	5.77	1.68	5.99	1.51	7.30	1.55	8.10	1.33	8.70	1.31	9.90	1.31
	25	-	-	5.20	1.96	5.64	1.85	5.90	1.79	6.06	1.63	6.19	1.50	7.70	1.54	8.50	1.37	9.10	1.36	10.00	1.33
	20	-	-	5.70	1.97	6.08	1.79	6.30	1.68	6.35	1.57	6.40	1.48	8.10	1.53	8.90	1.41	9.38	1.40	10.18	1.37
RAS-2.5WHVNP + RWM-2.5NE(-W)	60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	55	-	-	-	-	4.00	2.35	5.00	2.87	5.30	2.56	5.50	2.29	8.00	2.97	8.90	2.87	9.44	2.86	10.10	2.77
	50	-	-	-	-	4.40	2.32	5.10	2.62	6.05	2.73	6.59	2.66	8.50	3.05	9.10	2.69	9.91	2.78	10.20	2.62
	45	-	-	4.40	2.38	5.08	2.49	5.50	2.55	5.94	2.41	6.30	2.29	8.90	2.97	9.30	2.27	9.80	2.22	10.40	2.06
	40	-	-	4.55	2.31	5.18	2.36	5.57	2.40	6.17	2.27	6.65	2.17	9.00	2.50	9.50	2.12	10.20	2.13	10.60	1.98
	35	-	-	4.70	2.24	5.29	2.24	5.70	2.27	6.40	2.14	7.00	2.06	9.00	2.00	10.00	2.04	10.60	2.05	10.90	1.93
	30	-	-	4.90	2.09	5.65	2.14	6.10	2.18	6.52	1.95	6.86	1.77	9.50	2.11	10.20	1.73	10.70	1.68	11.00	1.53
	25	-	-	5.50	2.17	6.29	2.15	6.77	2.14	7.11	2.01	7.39	1.91	10.00	1.89	10.50	1.81	10.80	1.80	11.20	1.76
	20	-	-	6.10	2.09	6.94	2.14	7.44	2.18	7.70	1.86	7.91	1.77	10.50	2.11	10.80	1.73	11.00	1.67	11.50	1.61
RAS-3WHVNP + RWM-3.0NE(-W)	60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	55	-	-	-	-	4.50	3.21	5.50	3.55	6.33	3.46	7.00	3.40	9.20	3.83	10.50	3.68	11.00	3.57	11.40	3.28
	50	-	-	-	-	5.46	3.45	6.05	3.58	6.82	3.48	7.44	3.40	9.86	3.61	10.70	3.49	11.20	3.49	11.62	3.37
	45	-	-	5.50	3.33	5.70	2.93	6.40	3.04	7.14	3.01	7.70	2.96	10.00	3.22	11.00	2.89	11.50	2.82	11.70	2.56
	40	-	-	5.62	3.10	6.00	2.82	6.58	2.93	7.53	2.91	8.30	2.89	10.49	2.95	11.50	2.70	11.80	2.59	11.90	2.36
	35	-	-	5.90	2.95	6.40	2.85	6.71	2.80	7.92	2.81	8.90	2.83	11.00	2.68	11.70	2.44	11.90	2.34	12.10	2.16
	30	-	-	6.10	2.84	6.66	2.68	7.00	2.59	8.10	2.61	9.40	2.76	11.10	2.52	12.00	2.11	12.10	1.95	12.30	1.74
	25	-	-	6.50	2.61	6.90	2.43	7.10	2.31	8.30	2.40	10.20	2.71	11.30	2.22	12.10	2.16	12.30	2.11	12.40	2.00
	20	-	-	7.00	2.42	7.10	2.17	7.20	2.03	8.50	2.15	10.30	2.41	11.50	1.91	12.20	2.22	12.40	2.27	12.60	2.32
RAS-4WH(V)NPE + RWM-4.0NE(-W)	60	-	-	-	-	6.50	4.33	6.80	4.12	6.91	3.60	7.00	3.18	8.50	3.40	10.20	3.64	11.22	3.79	13.00	4.06
	55	-	-	-	-	7.20	4.30	9.70	5.56	9.90	4.86	10.50	4.47	13.50	4.75	14.36	4.69	14.77	4.62	15.46	4.50
	50	-	-	7.50	4.17	7.79	3.95	9.87	4.50	10.00	4.16	10.90	4.19	13.88	4.33	14.83	4.21	15.39	4.14	16.34	4.05
	45	7.20	4.03	8.28	4.05	9.35	4.07	10.00	4.08	10.60	3.95	11.50	3.97	14.10	3.85	15.30	3.73	16.02	3.66	17.00	3.54
	40	8.10	4.16	8.95	4.12	9.80	4.07	10.31	4.05	11.00	3.93	11.80	3.92	14.65	3.56	15.65	3.40	16.25	3.31	17.25	3.15
	35	9.00	4.29	9.62	4.18	10.25	4.08	10.62	4.01	11.83	4.08	12.80	4.13	15.20	3.27	16.00	3.08	16.48	2.96	17.50	2.81
	30	10.00	4.34	10.77	4.22	11.53	4.10	11.99	4.03	12.72	3.90	13.30	3.80	15.90	3.31	16.60	2.81	17.02	2.51	17.72	2.60
	25	11.64	4.44	12.16	4.31	12.68	4.18	13.00	4.10	13.72	3.98	13.58	3.61	16.10	2.82	17.00	2.74	17.54	2.69	18.44	2.55
	20	13.28	4.55	13.56	4.40	13.84	4.26	14.00	4.18	14.72	4.06	13.78	3.46	16.30	2.34	17.40	2.67	18.06	2.87	19.16	2.50
RAS-5WH(V)NPE + RWM-5.0NE(-W)	60	-	-	-	-	7.47	5.45	8.19	5.97	8.16	5.27	8.14	4.72	11.20	5.62	11.40	5.33	12.00	5.43	14.00	6.08
	55	-	-	-	-	9.22	6.36	11.20	6.22	12.21	6.24	12.96	6.22	15.20	6.30	16.00	5.71	16.50	5.37	16.70	5.20
	50	-	-	9.30	6.00	9.99	5.81	11.42	5.87	12.45	5.64	13.27	5.45	15.46	5.41	16.50	4.93	16.80	4.55	17.10	4.16
	45	8.10	4.54	9.43	4.90	10.76	5.27	11.60	5.50	12.68	5.04	13.59	4.69	15.70	4.53	17.00	4.15	17.50	3.86	18.00	3.70
	40	8.90	4.61	10.02	4.81	11.15	5.00	11.82	5.12	12.89	4.75	13.75	4.45	16.13	4.10	17.15	3.77	17.70	3.56	18.50	3.62
	35	9.70	4.69	10.62	4.71	11.53	4.74	12.00	4.72	13.10	4.46	13.90	4.21	16.70	3.70	17.30	3.39	17.80	3.24	18.80	3.55
	30	10.70	4.74	11.28	4.55	11.85	4.35	12.20	4.24	13.26	4.18	14.10	4.14	17.20	3.58	17.90	3.03	17.96	2.63	19.10	3.38
	25	11.16	4.42	12.25	4.42	13.34	4.42	14.00	4.42	14.70	4.32	15.27	4.24	17.90	3.51	18.50	3.08	18.80	2.82	19.50	3.13
	20	11.61	4.10	13.22	4.30	14.83	4.49	15.80	4.60	16.15	4.46	16.43	4.34	18.10	3.33	18.80	3.08	19.00	2.90	20.00	2.71

System	Water outlet temp (ºC)	Ambient temperature (ºC WB)																			
		-20		-15		-10		-7		-2		2		7		12		15		20	
		CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)
RAS-6WH(V)NPE + RWM-6.0NE(-W)	60	-	-	-	-	7.80	5.57	8.30	5.72	9.02	5.35	9.60	5.05	12.00	5.71	12.10	5.50	13.00	5.75	15.00	6.37
	55	-	-	-	-	10.38	7.39	12.00	7.18	12.96	7.09	13.96	7.16	17.00	7.13	17.20	6.14	17.30	5.98	17.40	5.70
	50	-	-	10.1	6.97	10.77	6.39	11.83	6.32	12.98	6.19	13.90	6.09	17.10	6.19	17.30	5.92	17.50	5.77	18.00	5.56
	45	9.00	4.86	10.32	5.34	11.63	5.81	12.50	6.13	13.56	5.68	14.48	5.36	17.30	5.33	17.50	4.49	18.00	4.14	18.60	3.51
	40	9.55	5.12	10.75	5.33	11.95	5.54	12.67	5.66	13.81	5.31	14.73	5.02	17.55	4.69	18.10	4.12	18.30	3.76	19.00	3.24
	35	10.10	5.37	11.18	5.32	12.27	5.26	13.00	5.27	14.06	4.93	15.00	4.69	17.80	4.05	18.20	3.64	18.60	3.54	19.60	3.43
	30	10.71	4.56	12.57	4.84	13.99	4.93	14.83	4.99	15.12	4.72	15.35	4.51	18.10	3.77	18.60	3.15	19.10	3.14	20.00	3.13
	25	11.30	4.48	12.83	4.63	14.02	4.64	14.73	4.65	15.18	4.47	15.54	4.33	18.50	3.78	19.90	3.37	20.50	3.27	21.00	3.05
	20	12.13	4.48	13.09	4.42	14.05	4.36	14.63	4.32	15.24	4.22	15.72	4.15	18.90	3.78	20.90	3.54	21.10	3.31	22.00	3.04
RAS-8WHNPE + RWM-8.0NE(-W)	60	-	-	-	-	11.92	9.47	13.14	9.00	14.98	9.45	16.45	9.81	21.15	12.41	22.00	10.61	22.50	8.56	23.50	5.60
	55	-	-	-	-	12.79	8.88	14.50	9.67	15.30	8.15	15.95	6.93	24.00	9.60	24.50	9.07	24.80	8.37	25.10	7.13
	50	-	-	12.0	8.60	13.65	8.28	15.70	9.58	16.75	8.97	17.58	8.48	24.01	10.45	24.90	9.31	25.50	7.83	26.10	5.59
	45	10.28	7.73	12.71	8.12	15.14	8.51	16.60	8.74	17.66	7.69	18.50	6.85	25.00	7.94	26.00	7.65	26.50	6.97	26.90	5.85
	40	12.20	8.54	13.31	7.82	15.77	8.04	17.24	8.17	18.36	7.39	19.25	6.76	25.25	7.41	26.30	6.98	26.90	6.76	27.10	6.25
	35	14.00	9.15	14.50	7.84	16.39	7.57	17.90	7.61	19.06	7.08	20.00	6.67	25.50	6.89	26.50	6.31	27.10	6.00	27.90	5.53
	30	14.80	8.60	14.27	7.12	16.97	7.51	18.58	7.74	19.38	6.80	20.02	6.04	26.50	6.97	27.00	6.28	27.60	6.02	28.10	5.53
	25	15.90	7.81	16.20	7.19	17.22	7.12	19.11	7.66	19.96	6.78	20.64	6.07	27.10	6.95	27.50	6.11	28.00	5.78	28.50	5.23
	20	16.00	6.22	16.50	6.38	17.47	6.74	19.64	7.57	20.55	6.76	21.27	6.11	27.70	6.92	28.00	5.95	28.50	5.57	29.00	4.97
RAS-10WHNPE + RWM-10.0NE(-W)	60	-	-	-	-	13.90	10.69	14.50	8.06	16.17	8.44	17.50	8.75	22.00	9.57	23.50	11.19	24.30	9.17	25.00	5.79
	55	-	-	-	-	15.76	13.87	17.30	12.36	18.61	10.71	19.50	9.29	25.52	10.65	26.00	10.83	26.50	9.58	27.20	7.42
	50	-	-	15.5	12.9	16.37	12.80	18.36	12.84	18.97	10.35	19.46	8.35	28.05	10.64	28.60	10.51	29.00	9.41	29.90	7.63
	45	13.00	8.67	14.81	9.52	17.12	10.71	18.50	11.42	19.89	9.24	21.00	7.50	32.00	10.67	33.00	10.64	33.20	9.78	33.60	8.40
	40	14.20	9.17	15.44	9.10	18.13	9.96	19.74	10.48	20.36	9.04	20.85	7.89	32.00	9.54	33.50	9.47	33.50	9.18	33.80	8.80
	35	15.10	9.44	16.07	8.67	18.50	8.90	21.00	9.55	21.00	8.91	21.70	8.68	32.00	8.42	34.00	8.29	34.70	8.25	34.90	7.97
	30	15.70	8.72	16.01	7.60	18.70	7.91	21.63	8.66	22.95	8.79	24.00	8.89	33.20	8.85	34.30	7.98	35.00	7.99	35.10	7.78
	25	16.40	8.63	16.35	7.41	18.80	7.63	22.03	8.48	23.74	8.90	25.11	9.24	33.50	8.70	34.50	6.90	35.80	7.02	36.20	6.88
	20	17.00	8.47	17.50	7.56	19.00	7.39	22.43	8.30	24.54	9.02	26.00	9.52	33.00	8.35	35.00	6.00	36.10	6.10	37.00	6.14

NOTE

- *CAP: Capacity at compressor maximum frequency. Capacity is valid for difference between water inlet and water outlet of 3-8ºC.*
- *IPT: Total input power.*

The table above shows the input power (IPT) at maximum capacity (CAP). Most of the time, the unit will run at partial load, so that the actual input power will be lower.

4.3.2 Maximum cooling capacity table (kW)

System	Water outlet temperature (ºC)	Ambient temperature (°C DB)							
		10	15	20	25	30	35	40	45
		CAP (kW)	CAP (kW)	CAP (kW)	CAP (kW)	CAP (kW)	CAP (kW)	CAP (kW)	CAP (kW)
RAS-2WHVNP + RWM-2.0NE(-W)	20	-	-		6.7	6.4	6.0	5.7	5.4
	18	-	-	7.1	6.6	6.3	6.1	5.6	5.0
	15	6.1	6.2	6.2	6.3	5.9	5.5	5.2	4.8
	10	5.8	5.7	5.7	5.7	5.4	5.1	4.8	4.6
	7	5.5	5.6	5.4	5.3	5.1	4.9	4.7	4.4
RAS-2.5WHVNP + RWM-2.5NE(-W)	20	-	-	-	7.6	7.2	6.9	6.5	6.1
	18	-	-	8.5	8.0	7.8	7.4	6.6	5.7
	15	8.4	8.1	7.8	7.6	7.1	6.6	6.1	5.6
	10	7.5	7.3	7.0	6.8	6.5	6.1	5.8	5.4
	7	7.0	6.8	6.5	6.4	6.1	5.8	5.6	5.3
RAS-3WHVNP + RWM-3.0NE(-W)	20	-	-	-	8.9	8.4	8.0	7.5	7.0
	18	-	-	9.0	8.9	8.7	8.5	7.5	6.5
	15	8.9	8.8	8.6	8.5	7.9	7.4	6.9	6.4
	10	8.6	8.3	8.0	7.8	7.4	6.9	6.5	6.1
	7	8.2	8.1	7.8	7.3	7.2	7.0	6.5	6.0
RAS-4WH(V)NPE + RWM-4.0NE(-W)	20	-	-	-	16.1	15.7	15.2	14.8	14.3
	18	-	-	17.0	16.1	15.1	15.0	14.4	13.7
	15	16.0	15.8	15.5	15.3	14.6	14.0	13.3	12.7
	10	15.1	14.7	14.4	14.0	13.2	12.5	11.7	11.0
	7	14.0	13.9	13.4	13.2	12.3	11.8	10.9	9.9
RAS-5WH(V)NPE + RWM-5.0NE(-W)	20	-	-	-	18.3	18.0	17.7	17.3	17.0
	18	-	-	18.5	17.6	17.4	16.0	15.0	14.0
	15	17.1	17.1	17.0	17.1	16.1	15.1	14.1	13.0
	10	16.6	16.5	16.4	16.2	15.0	13.8	12.6	11.4
	7	16.1	15.9	15.4	15.7	13.2	12.6	11.5	10.4
RAS-6WH(V)NPE + RWM-6.0NE(-W)	20				20.0	19.6	19.3	18.9	18.5
	18			20.0	19.0	17.8	17.5	17.3	16.8
	15	18.0	18.1	18.2	18.3	17.5	16.8	16.0	15.2
	10	17.5	17.4	17.2	17.1	16.0	14.9	13.7	12.6
	7	17.0	16.8	16.3	16.4	14.9	13.7	12.4	11.0
RAS-8WHNPE + RWM-8.0NE(-W)	20	-	-	-	25.8	25.0	24.2	23.4	22.6
	18	-	-	25.1	24.6	24.0	23.5	22.3	21.0
	15	23.2	23.0	22.8	22.6	21.8	21.1	20.4	19.6
	10	21.1	20.4	19.8	19.2	18.7	18.3	17.8	17.4
	7	24.0	19.9	19.2	17.2	16.7	16.4	16.2	16.0
RAS-10WHNPE + RWM-10.0NE(-W)	20	-	-	-	28.6	27.7	26.8	25.9	25.0
	18	-	-	28.5	28.0	27.5	27.0	25.0	23.0
	15	26.0	26.1	26.1	26.2	25.1	23.9	22.8	21.6
	10	25.3	24.6	23.9	23.2	22.2	21.3	20.3	19.4
	7	24.0	23.6	22.8	21.4	21.0	20.6	19.3	18.0

NOTE

CAP: Capacity at compressor maximum frequency. Capacity is valid for difference between water inlet and water outlet of 3-8ºC.

4.4 YUTAKI S COMBI

4.4.1 Maximum heating capacity table (kW) (Integrated)

System	Water outlet temp (ºC)	Ambient temperature (ºC WB)																			
		-20		-15		-10		-7		-2		2		7		12		15		20	
		CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)
RAS-2WHVNP + RWD-2.0NW(S)E-(200/260)S(-K)(-W)	60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	55	-	-	-	-	3.80	2.24	4.20	2.27	4.30	1.98	4.60	1.84	6.00	2.22	6.90	2.16	7.50	1.98	8.50	1.69
	50	-	-	-	-	4.02	2.08	4.41	2.10	4.45	1.88	4.70	1.78	6.10	2.65	7.05	1.94	7.65	1.84	8.70	1.68
	45	-	-	4.00	2.22	4.38	2.08	4.60	1.99	4.70	1.81	4.80	1.71	6.20	1.82	7.10	1.69	7.70	1.68	8.90	1.71
	40	-	-	4.25	2.09	4.51	1.95	4.66	1.87	4.93	1.73	5.15	1.62	6.60	1.69	7.55	1.52	8.16	1.50	9.20	1.46
	35	-	-	4.50	1.96	4.64	1.82	4.70	1.73	5.16	1.62	5.50	1.53	7.00	1.56	8.00	1.36	8.40	1.28	9.70	1.26
	30	-	-	4.70	1.96	5.20	1.92	5.50	1.90	5.77	1.68	5.99	1.51	7.30	1.55	8.10	1.33	8.70	1.31	9.90	1.31
	25	-	-	5.20	1.96	5.64	1.85	5.90	1.79	6.06	1.63	6.19	1.50	7.70	1.54	8.50	1.37	9.10	1.36	10.00	1.33
	20	-	-	5.70	1.97	6.08	1.79	6.30	1.68	6.35	1.57	6.40	1.48	8.10	1.53	8.90	1.41	9.38	1.40	10.18	1.37
RAS-2.5WHVNP + RWD-2.5NW(S)E-(200/260)S(-K)(-W)	60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	55	-	-	-	-	4.00	2.35	5.00	2.87	5.30	2.56	5.50	2.29	8.00	2.97	8.90	2.87	9.44	2.86	10.10	2.77
	50	-	-	-	-	4.40	2.32	5.10	2.62	6.05	2.73	6.59	2.66	8.50	3.05	9.10	2.69	9.91	2.78	10.20	2.62
	45	-	-	4.40	2.38	5.08	2.49	5.50	2.55	5.94	2.41	6.30	2.29	8.90	2.97	9.30	2.27	9.80	2.22	10.40	2.06
	40	-	-	4.55	2.31	5.18	2.36	5.57	2.40	6.17	2.27	6.65	2.17	9.00	2.50	9.50	2.12	10.20	2.13	10.60	1.98
	35	-	-	4.70	2.24	5.29	2.24	5.70	2.27	6.40	2.14	7.00	2.06	9.00	2.00	10.00	2.04	10.60	2.05	10.90	1.93
	30	-	-	4.90	2.09	5.65	2.14	6.10	2.18	6.52	1.95	6.86	1.77	9.50	2.11	10.20	1.73	10.70	1.68	11.00	1.53
	25	-	-	5.50	2.17	6.29	2.15	6.77	2.14	7.11	2.01	7.39	1.91	10.00	1.89	10.50	1.81	10.80	1.80	11.20	1.76
	20	-	-	6.10	2.09	6.94	2.14	7.44	2.18	7.70	1.86	7.91	1.77	10.50	2.11	10.80	1.73	11.00	1.67	11.50	1.61
RAS-3WHVNP + RWD-3.0NW(S)E-(200/260)S(-K)(-W)	60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	55	-	-	-	-	4.50	3.21	5.50	3.55	6.33	3.46	7.00	3.40	9.20	3.83	10.50	3.68	11.00	3.57	11.40	3.28
	50	-	-	-	-	5.46	3.45	6.05	3.58	6.82	3.48	7.44	3.40	9.86	3.61	10.70	3.49	11.20	3.49	11.62	3.37
	45	-	-	5.50	3.33	5.70	2.93	6.40	3.04	7.14	3.01	7.70	2.96	10.00	3.22	11.00	2.89	11.50	2.82	11.70	2.56
	40	-	-	5.62	3.10	6.00	2.82	6.58	2.93	7.53	2.91	8.30	2.89	10.49	2.95	11.50	2.70	11.80	2.59	11.90	2.36
	35	-	-	5.90	2.95	6.40	2.85	6.71	2.80	7.92	2.81	8.90	2.83	11.00	2.68	11.70	2.44	11.90	2.34	12.10	2.16
	30	-	-	6.10	2.84	6.66	2.68	7.00	2.59	8.10	2.61	9.40	2.76	11.10	2.52	12.00	2.11	12.10	1.95	12.30	1.74
	25	-	-	6.50	2.61	6.90	2.43	7.10	2.31	8.30	2.40	10.20	2.71	11.30	2.22	12.10	2.16	12.30	2.11	12.40	2.00
	20	-	-	7.00	2.42	7.10	2.17	7.20	2.03	8.50	2.15	10.30	2.41	11.50	1.91	12.20	2.22	12.40	2.27	12.60	2.32
RAS-4WH(V)NPE + RWD-4.0NW(S)E-(200/260)S(-K)(-W)	60	-	-	-	-	6.50	4.33	6.80	4.12	6.91	3.60	7.00	3.18	8.50	3.40	10.20	3.64	11.22	3.79	13.00	4.06
	55	-	-	-	-	7.20	4.30	9.70	5.56	9.90	4.86	10.50	4.47	13.50	4.75	14.36	5.16	14.77	5.37	15.46	3.50
	50	-	-	7.50	4.17	7.79	3.95	9.87	4.50	10.00	4.16	10.90	4.19	13.88	4.33	14.83	4.45	15.39	4.51	16.34	4.63
	45	7.20	4.03	8.28	4.05	9.35	4.07	10.00	4.08	10.60	3.95	11.50	3.97	14.10	3.85	15.30	3.73	16.02	3.66	17.00	3.49
	40	8.10	4.16	8.95	4.12	9.80	4.07	10.31	4.05	11.00	3.93	11.80	3.92	14.65	3.56	15.65	3.40	16.25	3.31	17.25	3.15
	35	9.00	4.29	9.62	4.18	10.25	4.08	10.62	4.01	11.83	4.08	12.80	4.13	15.20	3.27	16.00	3.08	16.48	2.96	17.50	2.81
	30	10.00	4.34	10.77	4.22	11.53	4.10	11.99	4.03	12.72	3.90	13.30	3.80	15.90	3.31	16.60	2.81	17.02	2.51	17.72	2.60
	25	11.64	4.44	12.16	4.31	12.68	4.18	13.00	4.10	13.72	3.98	13.58	3.61	16.10	2.82	17.00	2.74	17.54	2.69	18.44	2.55
	20	13.28	4.55	13.56	4.40	13.84	4.26	14.00	4.18	14.72	4.06	13.78	3.46	16.30	2.34	17.40	2.67	18.06	2.87	19.16	2.50

System	Water outlet temp (ºC)	Ambient temperature (ºC WB)																			
		-20		-15		-10		-7		-2		2		7		12		15		20	
		CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)
RAS-5WH(V)NPE + RWD-5.0NW(S)E-(200/260)S(-K)(-W)	60	-	-	-	-	7.47	5.45	8.19	5.97	8.16	5.27	8.14	4.72	11.20	5.62	11.40	5.33	12.00	5.43	14.00	6.08
	55	-	-	-	-	9.22	6.36	11.20	6.22	12.21	6.24	12.96	6.22	15.20	6.30	16.00	5.71	16.50	5.37	16.70	3.86
	50	-	-	9.30	6.00	9.99	5.81	11.42	5.87	12.45	5.64	13.27	5.45	15.46	5.41	16.50	4.93	16.80	4.55	17.10	3.92
	45	8.10	4.54	9.43	4.90	10.76	5.27	11.60	5.50	12.68	5.04	13.59	4.69	15.70	4.53	17.00	4.15	17.50	3.86	18.00	3.51
	40	8.90	4.61	10.02	4.81	11.15	5.00	11.82	5.12	12.89	4.75	13.75	4.45	16.13	4.10	17.15	3.77	17.70	3.56	18.50	3.19
	35	9.70	4.69	10.62	4.71	11.53	4.74	12.00	4.72	13.10	4.46	13.90	4.21	16.70	3.70	17.30	3.39	17.80	3.24	18.80	3.55
	30	10.70	4.74	11.28	4.55	11.85	4.35	12.20	4.24	13.26	4.18	14.10	4.14	17.20	3.58	17.90	3.03	17.96	2.63	19.10	3.38
	25	11.16	4.42	12.25	4.42	13.34	4.42	14.00	4.42	14.70	4.32	15.27	4.24	17.90	3.51	18.50	3.08	18.80	2.82	19.50	3.13
	20	11.61	4.10	13.22	4.30	14.83	4.49	15.80	4.60	16.15	4.46	16.43	4.34	18.10	3.33	18.80	3.08	19.00	2.90	20.00	2.71
RAS-6WH(V)NPE + RWD-6.0NW(S)E-(200/260)S(-K)(-W)	60	-	-	-	-	7.80	5.57	8.30	5.72	9.02	5.35	9.60	5.05	12.00	5.71	12.10	5.50	13.00	5.75	15.00	6.37
	55	-	-	-	-	10.38	7.39	12.00	7.18	12.96	7.09	13.96	7.16	17.00	7.13	17.20	6.14	17.30	5.56	17.40	4.60
	50	-	-	10.1	6.97	10.77	6.39	11.83	6.32	12.98	6.19	13.90	6.09	17.10	6.19	17.30	5.92	17.50	5.77	18.00	5.56
	45	9.00	4.86	10.32	5.34	11.63	5.81	12.50	6.13	13.56	5.68	14.48	5.36	17.30	5.33	17.50	4.49	18.00	4.14	18.60	3.51
	40	9.55	5.12	10.75	5.33	11.95	5.54	12.67	5.66	13.81	5.31	14.73	5.02	17.55	4.69	18.10	4.12	18.30	3.76	19.00	3.24
	35	10.10	5.37	11.18	5.32	12.27	5.26	13.00	5.27	14.06	4.93	15.00	4.69	17.80	4.05	18.20	3.64	18.60	3.54	19.60	3.43
	30	10.71	4.56	12.57	4.84	13.99	4.93	14.83	4.99	15.12	4.72	15.35	4.51	18.10	3.77	18.60	3.15	19.10	3.14	20.00	3.13
	25	11.30	4.48	12.83	4.63	14.02	4.64	14.73	4.65	15.18	4.47	15.54	4.33	18.50	3.78	19.90	3.37	20.50	3.27	21.00	3.05
	20	12.13	4.48	13.09	4.42	14.05	4.36	14.63	4.32	15.24	4.22	15.72	4.15	18.90	3.78	20.90	3.54	21.10	3.31	22.00	3.04

NOTE

- *CAP: Capacity at compressor maximum frequency. Capacity is valid for difference between water inlet and water outlet of 3-8ºC.*
- *IPT: Total input power.*

The table above shows the input power (IPT) at maximum capacity (CAP). Most of the time, the unit will run at partial load, so that the actual input power will be lower.

4.4.2 Maximum cooling capacity table (kW)

System	Water outlet temperature (ºC)	Ambient temperature (°C DB)							
		10	15	20	25	30	35	40	45
		CAP (kW)	CAP (kW)	CAP (kW)	CAP (kW)	CAP (kW)	CAP (kW)	CAP (kW)	CAP (kW)
RAS-2WHVNP + RWD-2.0NW(S) E-(200/260)S(-K)(-W)	20	-	-	-	6.7	6.4	6.0	5.7	5.4
	18	-	-	7.1	6.6	6.3	6.1	5.6	5.0
	15	6.1	6.2	6.2	6.3	5.9	5.5	5.2	4.8
	10	5.8	5.7	5.7	5.7	5.4	5.1	4.8	4.6
	7	5.5	5.6	5.4	5.3	5.1	4.9	4.7	4.4
RAS-2.5WHVNP + RWD-2.5NW(S) E-(200/260)S(-K)(-W)	20	-	-	-	7.6	7.2	6.9	6.5	6.1
	18	-	-	8.5	8.0	7.8	7.4	6.6	5.7
	15	8.4	8.1	7.8	7.6	7.1	6.6	6.1	5.6
	10	7.5	7.3	7.0	6.8	6.5	6.1	5.8	5.4
	7	7.0	6.8	6.5	6.4	6.1	5.8	5.6	5.3
RAS-3WHVNP + RWD-3.0NW(S) E-(200/260)S(-K)(-W)	20	-	-	-	8.9	8.4	8.0	7.5	7.0
	18	-	-	9.0	8.9	8.7	8.5	7.5	6.5
	15	8.9	8.8	8.6	8.5	7.9	7.4	6.9	6.4
	10	8.6	8.3	8.0	7.8	7.4	6.9	6.5	6.1
	7	8.2	8.1	7.8	7.3	7.2	7.0	6.5	6.0
RAS-4WH(V)NPE + RWD-4.0NW(S) E-(200/260)S(-K)(-W)	20	-	-	-	16.1	15.7	15.2	14.8	14.3
	18	-	-	17.0	16.1	15.1	15.0	14.4	13.7
	15	16.0	15.8	15.5	15.3	14.6	14.0	13.3	12.7
	10	15.1	14.7	14.4	14.0	13.2	12.5	11.7	11.0
	7	14.0	13.9	13.4	13.2	12.3	11.8	10.9	9.9
RAS-5WH(V)NPE + RWD-5.0NW(S) E-(200/260)S(-K)(-W)	20	-	-	-	18.3	18.0	17.7	17.3	17.0
	18	-	-	18.5	17.6	17.4	16.0	15.0	14.0
	15	17.1	17.1	17.0	17.1	16.1	15.1	14.1	13.0
	10	16.6	16.5	16.4	16.2	15.0	13.8	12.6	11.4
	7	16.1	15.9	15.4	15.7	13.2	12.6	11.5	10.4
RAS-6WH(V)NPE + RWD-6.0NW(S) E-(200/260)S(-K)(-W)	20	-	-	-	20.0	19.6	19.3	18.9	18.5
	18	-	-	20.0	19.0	17.8	17.5	17.3	16.8
	15	18.0	18.1	18.2	18.3	17.5	16.8	16.0	15.2
	10	17.5	17.4	17.2	17.1	16.0	14.9	13.7	12.6
	7	17.0	16.8	16.3	16.4	14.9	13.7	12.4	11.0

NOTE

CAP: Capacity at compressor maximum frequency. Capacity is valid for difference between water inlet and water outlet of 3-8 ºC.

4.5 YUTAKI S 80

4.5.1 Maximum heating capacity table (kW) (Integrated)

System	Water outlet temp. (ºC)	Ambient temperature (ºC WB)																			
		-20		-15		-10		-7		-2		2		7		12		15		20	
		CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)
RAS-4WH(V)NPE + RWH-4.0VNF(W)E	80	10.60	6.42	11.10	6.50	10.80	6.28	11.90	6.61	11.84	6.12	11.79	5.73	13.50	5.87	14.50	5.69	15.10	5.58	16.10	5.39
	75	10.73	6.26	11.26	6.35	11.23	6.29	12.10	6.49	12.14	6.10	12.17	5.78	13.83	5.89	14.67	5.68	15.17	5.55	16.01	5.35
	70	10.91	6.05	11.47	6.16	11.81	6.30	12.37	6.33	12.54	6.06	12.68	5.85	14.27	5.91	14.89	5.67	15.26	5.52	15.88	5.28
	65	11.00	5.95	11.58	6.06	12.10	6.30	12.50	6.25	12.74	6.05	12.94	5.89	14.49	5.92	15.00	5.66	15.31	5.51	15.82	5.25
	60	11.15	5.92	11.67	6.00	12.16	6.15	12.50	6.14	12.90	6.07	13.22	6.01	14.49	5.46	15.00	5.25	15.31	5.13	15.81	4.38
	55	11.30	5.89	11.76	5.94	12.22	6.00	12.50	6.04	13.06	6.09	13.64	6.55	14.49	5.00	15.00	4.84	15.30	4.74	15.81	3.50
	50	11.90	6.07	12.22	6.02	12.39	5.93	12.50	5.84	12.98	5.61	13.66	5.80	14.50	4.84	15.20	4.84	15.62	4.84	16.32	4.84
	45	12.50	6.25	12.50	6.03	12.50	5.81	12.50	5.68	13.02	5.38	13.78	5.49	14.50	4.53	15.30	4.64	15.78	4.70	16.58	4.80
	40	11.14	5.59	11.11	5.24	11.09	4.89	11.08	4.67	12.08	4.69	12.51	4.41	14.85	3.90	15.65	3.86	16.13	3.83	16.93	3.79
	35	9.00	4.29	9.62	4.18	10.25	4.08	10.62	4.01	11.83	4.08	12.80	4.13	15.20	3.27	16.00	3.08	16.48	2.96	17.50	2.81
	30	10.00	4.34	10.77	4.22	11.53	4.10	11.99	4.03	12.72	3.90	13.30	3.80	15.90	3.31	16.60	2.81	17.02	2.51	17.72	2.60
	25	11.64	4.44	12.16	4.31	12.68	4.18	13.00	4.10	13.72	3.98	13.58	3.61	16.10	2.82	17.00	2.74	17.54	2.69	18.44	2.55
	20	13.28	4.55	13.56	4.40	13.84	4.26	14.00	4.18	14.72	4.06	13.78	3.46	16.30	2.34	17.40	2.67	18.06	2.87	19.16	2.50
RAS-5WH(V)NPE + RWH-5.0VNF(W)E	80	11.65	7.28	12.13	7.32	12.70	7.47	12.90	7.37	13.12	7.17	13.30	7.00	15.00	6.82	16.50	6.60	17.40	6.47	18.90	6.25
	75	12.43	7.60	12.82	7.52	13.20	7.58	13.43	7.39	13.62	7.24	13.77	7.12	15.63	6.85	16.83	6.64	17.56	6.52	18.76	6.31
	70	13.48	8.02	13.73	7.79	13.87	7.73	14.14	7.42	14.28	7.34	14.39	7.27	16.46	6.89	17.28	6.70	17.77	6.59	18.58	6.39
	65	14.00	8.24	14.19	7.93	14.20	7.80	14.50	7.44	14.61	7.39	14.70	7.35	16.88	6.92	17.50	6.73	17.87	6.62	18.49	6.44
	60	14.10	7.96	14.25	7.65	14.32	7.44	14.50	7.17	14.89	7.26	15.20	7.33	16.95	6.61	17.50	6.38	17.83	6.25	18.38	6.02
	55	14.20	7.68	14.32	7.38	14.43	7.08	14.50	6.90	15.17	7.13	15.70	7.30	17.02	6.30	17.50	6.03	17.79	5.87	18.27	5.61
	50	14.35	7.56	14.42	7.37	14.44	7.17	14.50	6.99	14.88	6.81	15.19	6.66	16.98	5.98	17.50	5.89	17.81	5.84	18.33	5.75
	45	14.50	7.44	14.50	7.23	14.50	7.03	14.50	6.90	14.88	6.59	15.18	6.33	17.00	5.67	17.50	5.65	17.80	5.63	18.30	5.61
	40	12.10	6.06	12.56	5.97	13.02	5.88	13.29	5.83	13.99	5.52	14.55	5.28	16.76	4.66	17.40	4.52	17.79	4.43	18.43	4.29
	35	9.70	4.69	10.62	4.71	11.53	4.74	12.00	4.72	13.10	4.46	13.90	4.21	16.70	3.70	17.30	3.39	17.80	3.24	18.80	3.55
	30	10.70	4.74	11.28	4.55	11.85	4.35	12.20	4.24	13.26	4.18	14.10	4.14	17.20	3.58	17.90	3.03	17.96	2.63	19.10	3.38
	25	11.16	4.42	12.25	4.42	13.34	4.42	14.00	4.42	14.70	4.32	15.27	4.24	17.90	3.51	18.50	3.08	18.80	2.82	19.50	3.13
	20	11.61	4.10	13.22	4.30	14.83	4.49	15.80	4.60	16.15	4.46	16.43	4.34	18.10	3.33	18.80	3.08	19.00	2.90	20.00	2.71
RAS-6WH(V)NPE + RWH-6.0VNF(W)E	80	12.70	8.47	13.01	8.36	14.70	9.19	13.50	8.18	13.78	7.84	14.00	7.57	16.00	7.62	17.50	7.29	18.40	7.10	19.90	6.77
	75	13.40	8.73	13.76	8.52	14.90	9.12	14.33	8.19	14.70	8.02	15.00	7.88	16.64	7.63	17.77	7.30	18.44	7.11	19.57	6.78
	70	14.33	9.08	14.76	8.74	15.17	9.04	15.44	8.20	15.94	8.25	16.33	8.29	17.50	7.64	18.12	7.31	18.50	7.12	19.13	6.80
	65	14.80	9.25	15.26	8.85	15.30	9.00	16.00	8.21	16.56	8.37	17.00	8.50	17.92	7.64	18.30	7.32	18.53	7.13	18.90	6.81
	60	14.95	8.82	15.37	8.59	15.58	8.64	16.05	8.23	16.38	8.28	16.65	8.33	17.92	6.91	18.65	7.11	19.09	7.24	19.81	7.45
	55	15.10	8.39	15.48	8.34	15.87	8.29	16.10	8.26	16.21	8.20	16.30	8.15	17.92	6.17	19.00	6.91	19.65	7.35	20.72	8.09
	50	15.55	8.64	15.78	8.59	16.01	8.40	16.15	8.14	16.37	7.82	16.54	7.56	17.97	6.67	18.88	6.59	19.43	6.55	20.34	6.48
	45	16.00	8.89	16.08	8.59	16.15	8.28	16.20	8.10	16.36	7.58	16.49	7.17	18.00	6.55	19.00	6.33	19.60	6.21	20.60	5.99
	40	13.05	7.13	13.63	6.95	14.21	6.77	14.56	6.67	15.22	6.26	15.75	5.93	17.88	5.29	18.60	4.99	19.03	4.80	19.76	4.50
	35	10.10	5.37	11.18	5.32	12.27	5.26	13.00	5.27	14.06	4.93	15.00	4.69	17.80	4.05	18.20	3.64	18.60	3.54	19.60	3.43
	30	10.71	4.56	12.57	4.84	13.99	4.93	14.83	4.99	15.12	4.72	15.35	4.51	18.10	3.77	18.60	3.15	19.10	3.14	20.00	3.13
	25	11.30	4.48	12.83	4.63	14.02	4.64	14.73	4.65	15.18	4.47	15.54	4.33	18.50	3.78	19.90	3.37	20.50	3.27	21.00	3.05
	20	12.13	4.48	13.09	4.42	14.05	4.36	14.63	4.32	15.24	4.22	15.72	4.15	18.90	3.78	20.90	3.54	21.10	3.31	22.00	3.04

NOTE

- *CAP: Capacity at compressor maximum frequency (kW). Capacity is valid for difference between water inlet and water outlet of 3-10ºC.*
- *IPT: Total input power (kW).*

The table above shows the input power (IPT) at maximum capacity (CAP). Most of the time, the unit will run at partial load, so that the actual input power will be lower.

4.6 YUTAKI M

4.6.1 Maximum heating capacity table (kW) (Integrated)

System	Water outlet temp (ºC)	Ambient temperature (ºC WB)																			
		-20		-15		-10		-7		-2		2		7		12		15		20	
		CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)	CAP (kW)	IPT (kW)
RASM-3VNE	60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	55	-	-	-	-	4.50	3.21	5.50	3.55	6.33	3.46	7.00	3.40	9.20	3.83	10.50	3.68	11.00	3.57	11.40	3.28
	50	-	-	-	-	5.46	3.45	6.05	3.58	6.82	3.48	7.44	3.40	9.86	3.61	10.70	3.49	11.20	3.49	11.62	3.37
	45	-	-	5.50	3.33	5.70	2.93	6.40	3.04	7.14	3.01	7.70	2.96	10.00	3.22	11.00	2.89	11.50	2.82	11.70	2.56
	40	-	-	5.62	3.10	6.00	2.82	6.58	2.93	7.53	2.91	8.30	2.89	10.49	2.95	11.50	2.70	11.80	2.59	11.90	2.36
	35	-	-	5.90	2.95	6.40	2.85	6.71	2.80	7.92	2.81	8.90	2.83	11.00	2.68	11.70	2.44	11.90	2.34	12.10	2.16
	30	-	-	6.10	2.84	6.66	2.68	7.00	2.59	8.10	2.61	9.40	2.76	11.10	2.52	12.00	2.11	12.10	1.95	12.30	1.74
	25	-	-	6.50	2.61	6.90	2.43	7.10	2.31	8.30	2.40	10.20	2.71	11.30	2.22	12.10	2.16	12.30	2.11	12.40	2.00
	20	-	-	7.00	2.42	7.10	2.17	7.20	2.03	8.50	2.15	10.30	2.41	11.50	1.91	12.20	2.22	12.40	2.27	12.60	2.32
RASM-4(V)NE	60	-	-	-	-	6.50	4.33	6.80	4.12	6.91	3.60	7.00	3.18	8.50	3.40	10.20	3.64	11.22	3.79	13.00	4.06
	55	-	-	-	-	7.20	4.30	9.70	5.56	9.90	4.86	10.50	4.47	13.50	4.75	14.36	5.16	14.77	5.37	15.46	3.50
	50	-	-	7.50	4.17	7.79	3.95	9.87	4.50	10.00	4.16	10.90	4.19	13.88	4.33	14.83	4.45	15.39	4.51	16.34	4.63
	45	7.20	4.03	8.28	4.05	9.35	4.07	10.00	4.08	10.60	3.95	11.50	3.97	14.10	3.85	15.30	3.73	16.02	3.66	17.00	3.49
	40	8.10	4.16	8.95	4.12	9.80	4.07	10.31	4.05	11.00	3.93	11.80	3.92	14.65	3.56	15.65	3.40	16.25	3.31	17.25	3.15
	35	9.00	4.29	9.62	4.18	10.25	4.08	10.62	4.01	11.83	4.08	12.80	4.13	15.20	3.27	16.00	3.08	16.48	2.96	17.50	2.81
	30	10.00	4.34	10.77	4.22	11.53	4.10	11.99	4.03	12.72	3.90	13.30	3.80	15.90	3.31	16.60	2.81	17.02	2.51	17.72	2.60
	25	11.64	4.44	12.16	4.31	12.68	4.18	13.00	4.10	13.72	3.98	13.58	3.61	16.10	2.82	17.00	2.74	17.54	2.69	18.44	2.55
	20	13.28	4.55	13.56	4.40	13.84	4.26	14.00	4.18	14.72	4.06	13.78	3.46	16.30	2.34	17.40	2.67	18.06	2.87	19.16	2.50
RASM-5(V)NE	60	-	-	-	-	7.47	5.45	8.19	5.97	8.16	5.27	8.14	4.72	11.20	5.62	11.40	5.33	12.00	5.43	14.00	6.08
	55	-	-	-	-	9.22	6.36	11.20	6.22	12.21	6.24	12.96	6.22	15.20	6.30	16.00	5.71	16.50	5.37	16.70	3.86
	50	-	-	9.30	6.00	9.99	5.81	11.42	5.87	12.45	5.64	13.27	5.45	15.46	5.41	16.50	4.93	16.80	4.55	17.10	3.92
	45	8.10	4.54	9.43	4.90	10.76	5.27	11.60	5.50	12.68	5.04	13.59	4.69	15.70	4.53	17.00	4.15	17.50	3.86	18.00	3.51
	40	8.90	4.61	10.02	4.81	11.15	5.00	11.82	5.12	12.89	4.75	13.75	4.45	16.13	4.10	17.15	3.77	17.70	3.56	18.50	3.19
	35	9.70	4.69	10.62	4.71	11.53	4.74	12.00	4.72	13.10	4.46	13.90	4.21	16.70	3.70	17.30	3.39	17.80	3.24	18.80	3.55
	30	10.70	4.74	11.28	4.55	11.85	4.35	12.20	4.24	13.26	4.18	14.10	4.14	17.20	3.58	17.90	3.03	17.96	2.63	19.10	3.38
	25	11.16	4.42	12.25	4.42	13.34	4.42	14.00	4.42	14.70	4.32	15.27	4.24	17.90	3.51	18.50	3.08	18.80	2.82	19.50	3.13
	20	11.61	4.10	13.22	4.30	14.83	4.49	15.80	4.60	16.15	4.46	16.43	4.34	18.10	3.33	18.80	3.08	19.00	2.90	20.00	2.71
RASM-6(V)NE	60	-	-	-	-	7.80	5.57	8.30	5.72	9.02	5.35	9.60	5.05	12.00	5.71	12.10	5.50	13.00	5.75	15.00	6.37
	55	-	-	-	-	10.38	7.39	12.00	7.18	12.96	7.09	13.96	7.16	17.00	7.13	17.20	6.14	17.30	5.56	17.40	4.60
	50	-	-	10.1	6.97	10.77	6.39	11.83	6.32	12.98	6.19	13.90	6.09	17.10	6.19	17.30	5.92	17.50	5.77	18.00	5.56
	45	9.00	4.86	10.32	5.34	11.63	5.81	12.50	6.13	13.56	5.68	14.48	5.36	17.30	5.33	17.50	4.49	18.00	4.14	18.60	3.51
	40	9.55	5.12	10.75	5.33	11.95	5.54	12.67	5.66	13.81	5.31	14.73	5.02	17.55	4.69	18.10	4.12	18.30	3.76	19.00	3.24
	35	10.10	5.37	11.18	5.32	12.27	5.26	13.00	5.27	14.06	4.93	15.00	4.69	17.80	4.05	18.20	3.64	18.60	3.54	19.60	3.43
	30	10.71	4.56	12.57	4.84	13.99	4.93	14.83	4.99	15.12	4.72	15.35	4.51	18.10	3.77	18.60	3.15	19.10	3.14	20.00	3.13
	25	11.30	4.48	12.83	4.63	14.02	4.64	14.73	4.65	15.18	4.47	15.54	4.33	18.50	3.78	19.90	3.37	20.50	3.27	21.00	3.05
	20	12.13	4.48	13.09	4.42	14.05	4.36	14.63	4.32	15.24	4.22	15.72	4.15	18.90	3.78	20.90	3.54	21.10	3.31	22.00	3.04

NOTE

- *CAP: Capacity at maximum compressor frequency (kW). Capacity is valid for difference between water inlet and water outlet of 3-8 ºC.*
- *IPT: Total input power (kW)*

The table above shows the input power (IPT) at maximum capacity (CAP). Most of the time, the unit runs at partial load, so that the actual input is lower.

4.6.2 Maximum cooling capacity table (kW)

System	Water outlet temperature (ºC)	Ambient temperature (°C DB)							
		10	15	20	25	30	35	40	45
		CAP (kW)	CAP (kW)	CAP (kW)	CAP (kW)	CAP (kW)	CAP (kW)	CAP (kW)	CAP (kW)
RASM-3VNE	22	-	-	-	9.8	9.3	8.7	8.2	7.7
	18	-	-	9.9	9.8	9.6	9.4	8.3	7.2
	15	9.8	9.6	9.5	9.3	8.7	8.2	7.6	7.0
	10	9.5	9.2	8.8	8.5	8.1	7.6	7.2	6.8
	7	9.0	8.9	8.5	8.1	7.9	7.7	7.2	6.6
RASM-4(V)NE	22	-	-	-	19.8	18.7	17.6	16.5	15.4
	18	-	-	18.0	17.9	16.8	15.0	14.4	13.7
	15	18.0	17.7	17.4	17.1	16.0	14.9	13.8	12.7
	10	16.1	16.0	15.9	15.8	14.6	13.4	12.2	11.0
	7	15.8	15.1	14.6	15.0	13.3	11.8	10.9	9.9
RASM-5(V)NE	22	-	-	-	22.3	21.2	20.1	19.1	18.0
	18	-	-	20.9	19.6	18.3	16.0	15.4	14.7
	15	20.8	20.1	19.3	18.7	17.4	16.2	14.9	13.7
	10	20.1	19.2	18.2	17.2	15.9	14.5	13.2	11.9
	7	18.8	18.1	17.0	16.4	14.6	12.6	11.7	10.8
RASM-6(V)NE	22	-	-	-	23.5	22.4	21.2	20.1	19.0
	18	-	-	22.0	21.1	19.8	17.8	17.5	17.0
	15	22.1	21.4	20.7	20.1	19.0	18.0	17.0	16.0
	10	21.5	20.4	19.4	18.3	17.0	15.8	14.5	13.2
	7	20.0	19.3	18.1	17.3	15.5	13.7	12.6	11.5

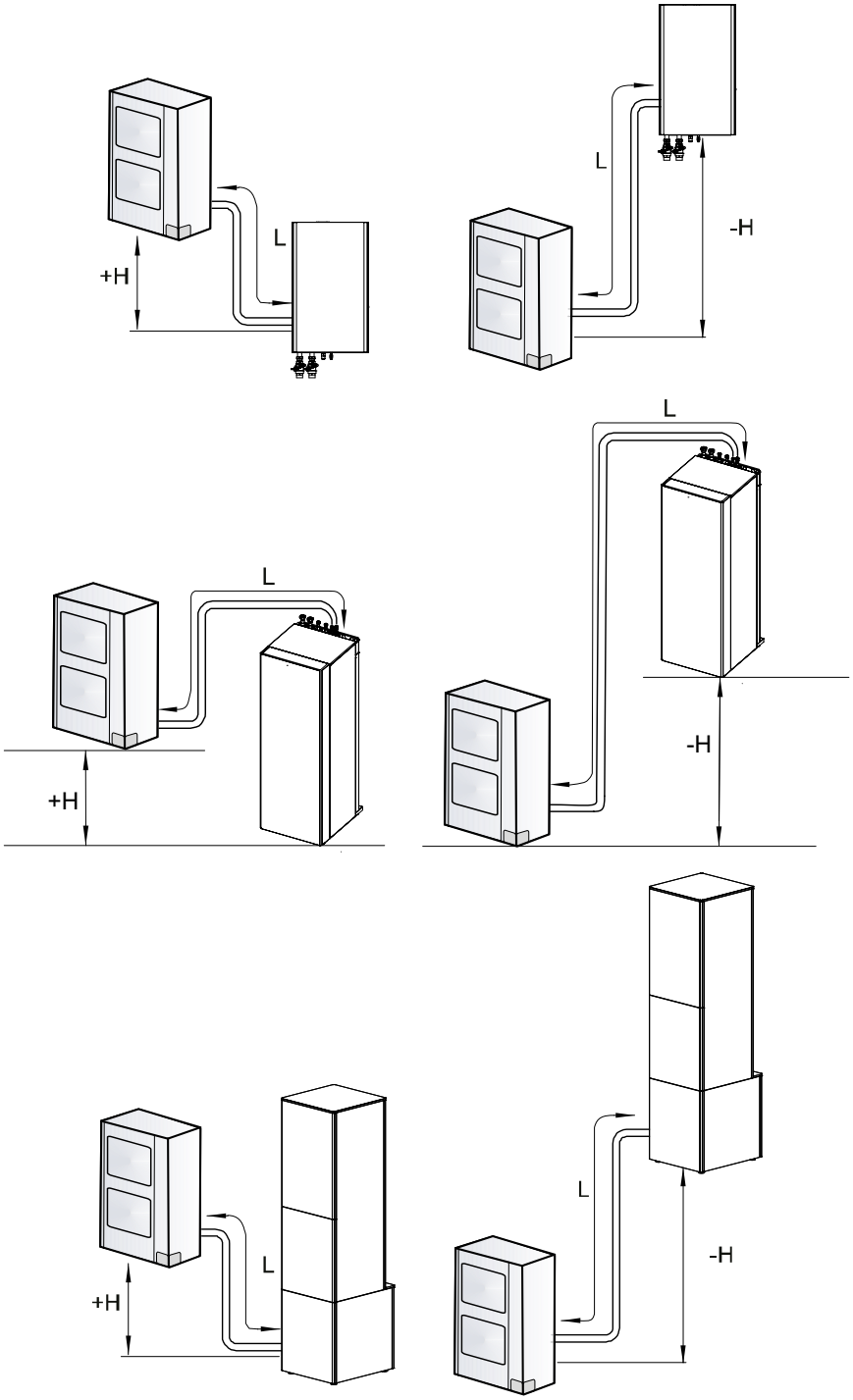
NOTE

CAP: Capacity at compressor maximum frequency. Capacity is valid for difference between water inlet and water outlet of 3-8 ºC.

4.7 Correction factors

4.7.1 Piping length correction factor

The correction factor is based on the equivalent piping length in metres (EL) and the height difference between outdoor unit and indoor unit in metres (H).



H: Height difference between indoor unit and outdoor unit (m).

- H>0: Outdoor unit is placed higher than indoor unit (m).
- H<0: Outdoor unit is placed lower than indoor unit (m).

L: Actual one-way piping length between indoor unit and outdoor unit (m).

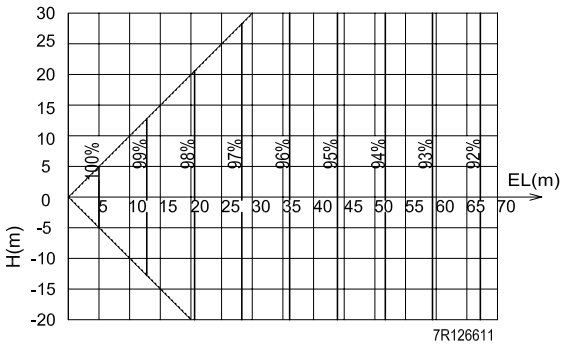
EL: Equivalent one-way piping length between indoor unit and outdoor unit (m).

- One 90º elbow is 0.5 m.
- One 180º bend is 1.5 m.
- One Multi-kit is 0.5 m.

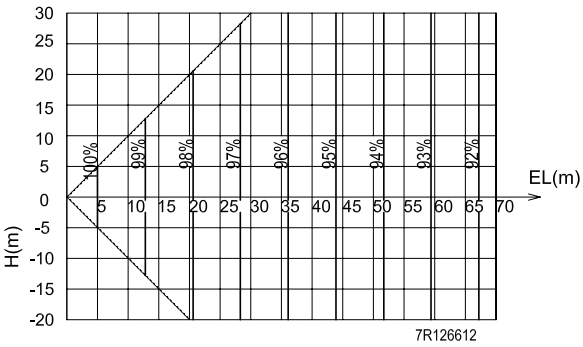
◆ Heating piping length correction factor

Heating

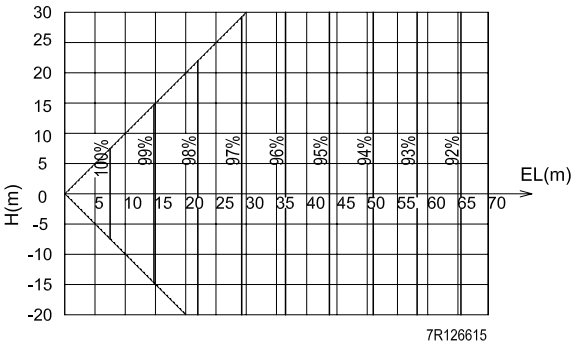
RAS-2WHVNP



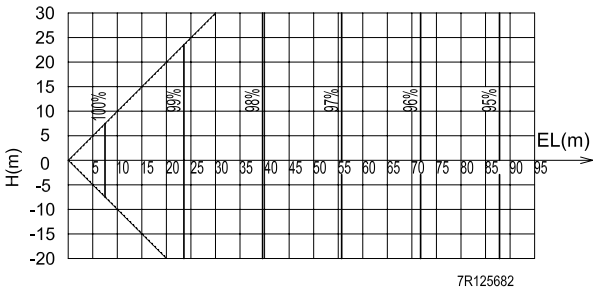
RAS-2.5WHVNP



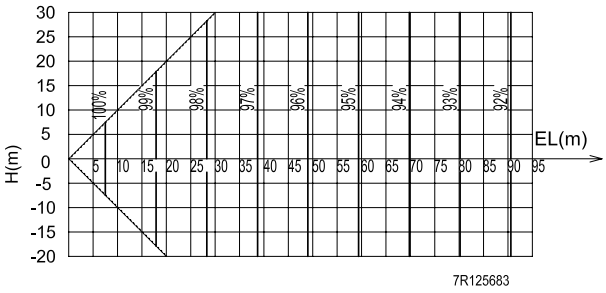
RAS-3WHVNP



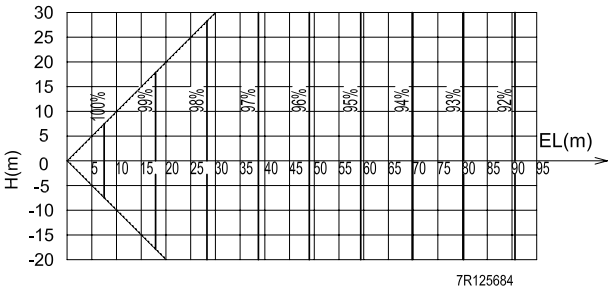
RAS-4WH(V)NPE



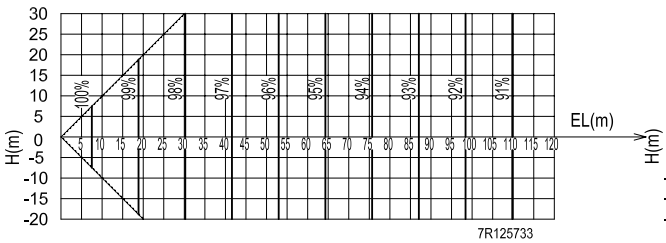
RAS-5WH(V)NPE



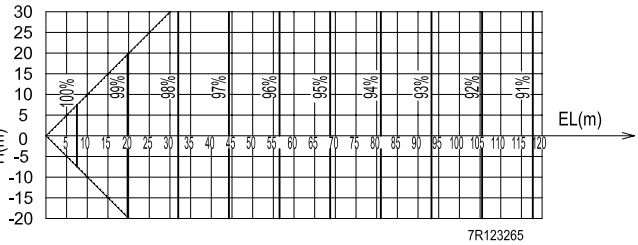
RAS-6WH(V)NPE



RAS-8WHNPE



RAS-10WHNPE

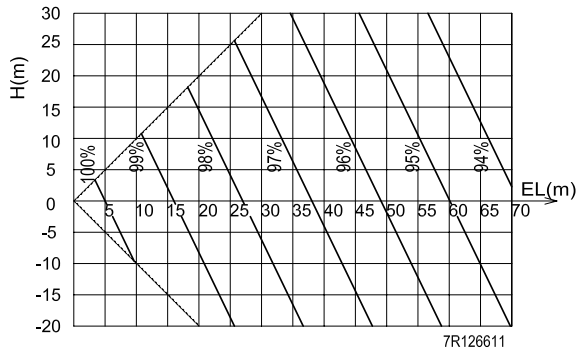


4

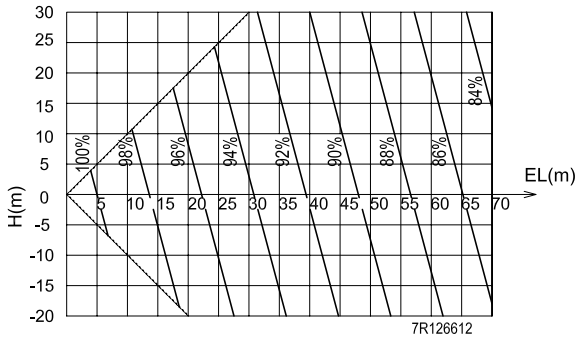
◆ Cooling piping length correction factor

Cooling

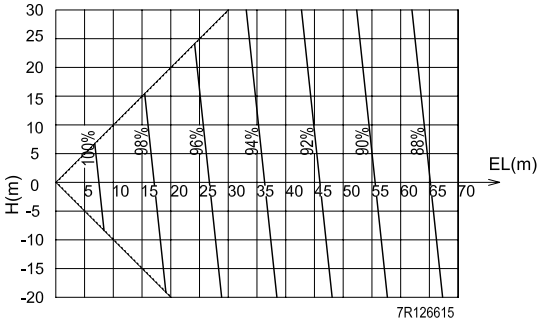
RAS-2WHVNP



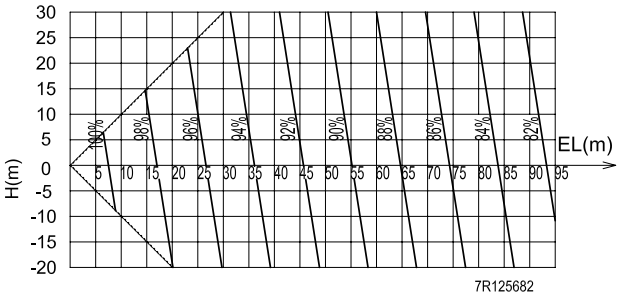
RAS-2.5WHVNP



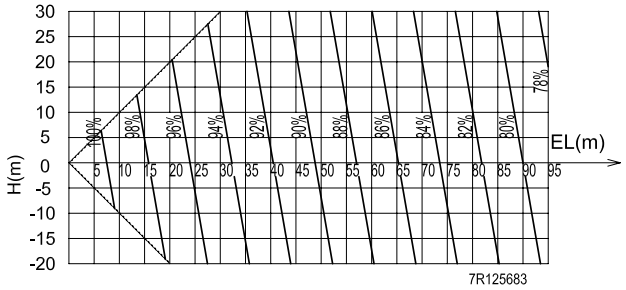
RAS-3WHVNP



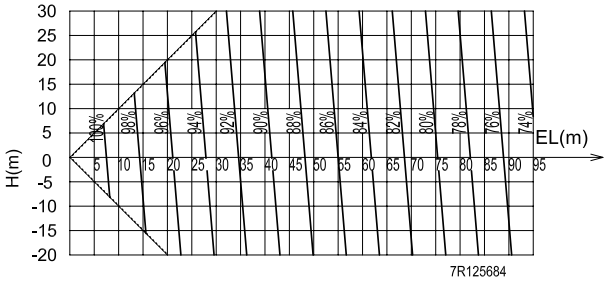
RAS-4WH(V)NPE



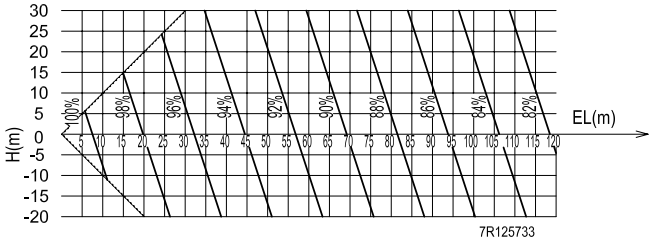
RAS-5WH(V)NPE



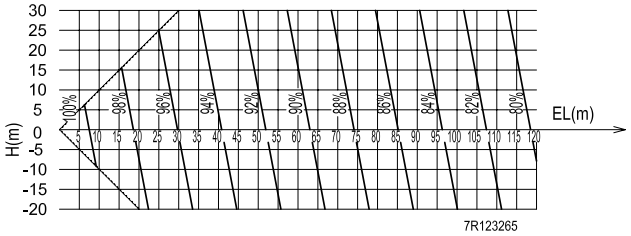
RAS-6WH(V)NPE



RAS-8WHNPE



RAS-10WHNPE



4.7.2 Correction factor owing to use of glycol (only for YUTAKI M)

◆ Application at low ambient temperature

When the ambient temperature is low in winter, the water in the pipes and circulating pump may freeze and damage the pipes and water pumps during shutdown periods.

To prevent this, it is useful to drain the water from the installation or not to cut off the power supply of the installation, as an electrical cable can prevent the water from freezing in the circuit.

In addition, in cases where it is difficult to drain the water, it is advisable to use a mixture with antifreeze glycol (ethylene or propylene at a concentration between 10% and 40%).

Unit performance may be reduced when operating with glycol, depending on the percentage of glycol used, since glycol is denser than water.

Two tables are shown below (one for ethylene glycol and the other for propylene glycol), indicating the percentage of ethylene glycol recommended for diverse values of outdoor air inlet temperature, with their respective correction factors.

Corrected heating capacity = capacity correction factor owing to use of glycol × heating capacity

- Ethylene glycol

Ambient Temperature	DB (°C)	-3	-7	-13	-22
Percentage of glycol required	%	10	20	30	40
Capacity correction factor	f_{gh}	1.00	1.00	0.99	0.99
Consumed power correction factor	f_{gi}	1.01	1.02	1.03	1.04
Flow rate correction factor	f_{gc}	1.01	1.01	1.02	1.04
Pressure loss correction factor	f_{gp}	1.03	1.09	1.16	1.26

- Propylene glycol

Ambient Temperature	DB (°C)	-3	-7	-13	-22
Percentage of glycol required	%	10	20	30	40
Capacity correction factor	f_{gh}	1.00	1.00	0.99	0.99
Consumed power correction factor	f_{gi}	1.01	1.02	1.03	1.04
Flow rate correction factor	f_{gc}	1.02	1.02	1.04	1.07
Pressure loss correction factor	f_{gp}	1.24	1.31	1.39	1.51

⚠ CAUTION

The use of glycol affect to the reading of some parameters like “water flow level” and “capacity” shown through the unit controller menu. When glycol is used, these data are not correct and must be not used.

5. Acoustic characteristic curves

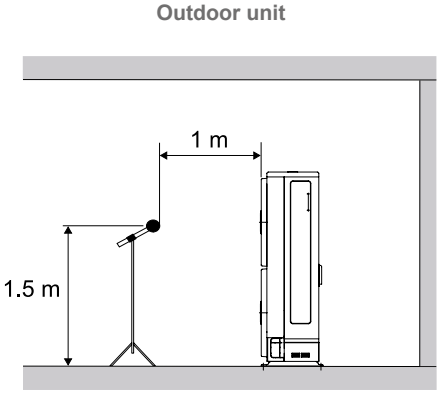
Index

5.1 Considerations 168

5.2 Sound pressure level for outdoor unit 169

5.1 Considerations

1 Distance of the unit from the measuring point: At 1 meter from the unit's front surface; 1,5 meter from floor level.



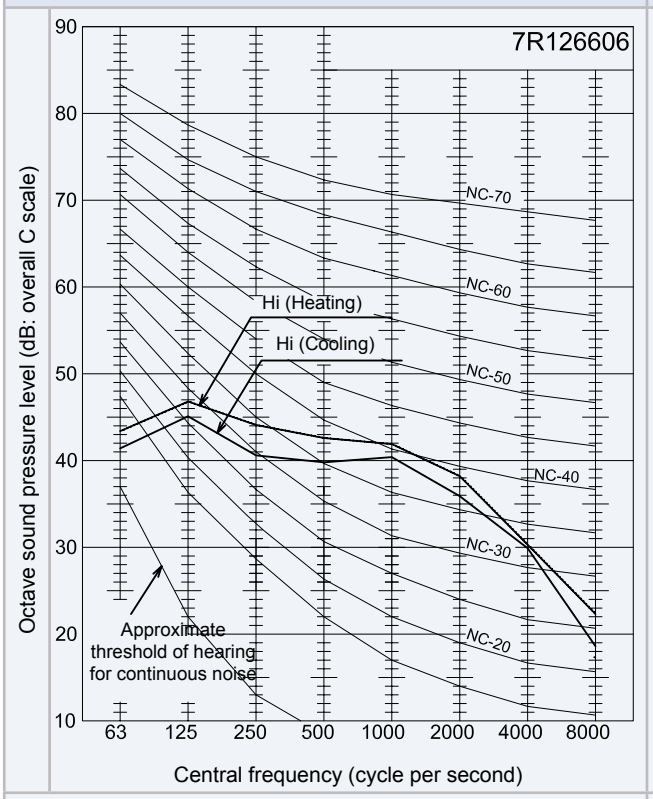
2 The data is measured in an anechoic chamber, so reflected sound should be taken into consideration when installing the unit.

3 The sound measured with the curve A shown in dB(A) represents the attenuation in function of frequency as perceived by the human ear.

4 Reference acoustic pressure 0 dB=20 µPa

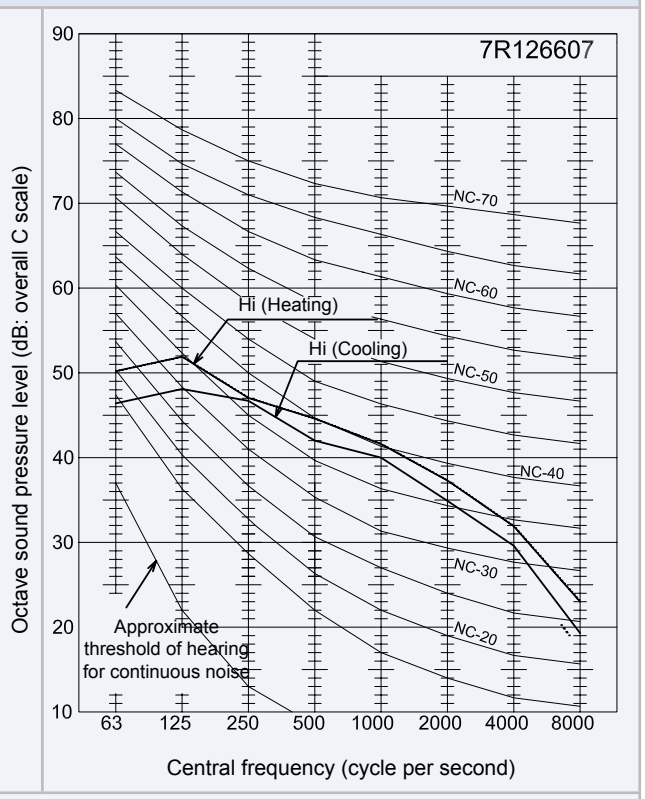
5.2 Sound pressure level for outdoor unit

RAS-2WHVNP



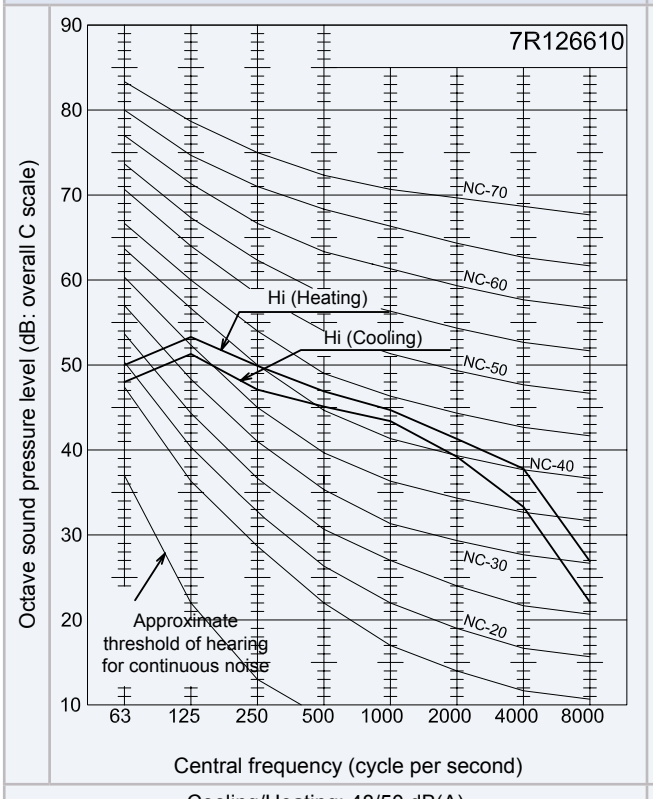
Cooling/Heating: 44/46 dB(A)

RAS-2.5WHVNP



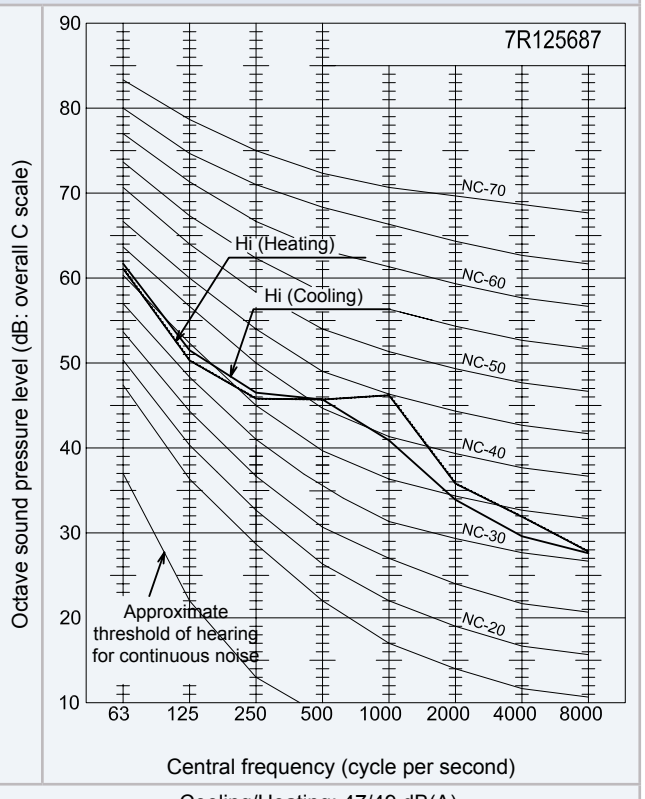
Cooling/Heating: 45/47 dB(A)

RAS-3WHVNP



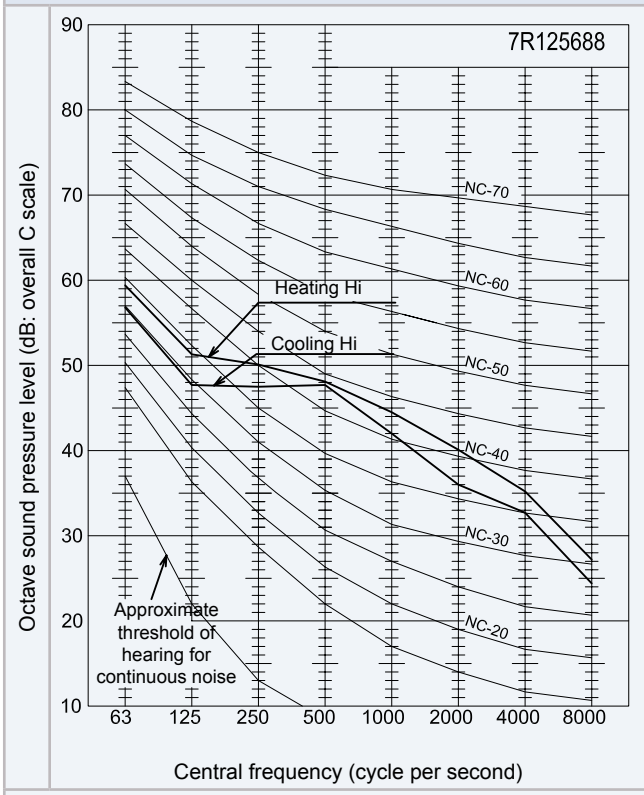
Cooling/Heating: 48/50 dB(A)

RAS-4WH(V)NPE



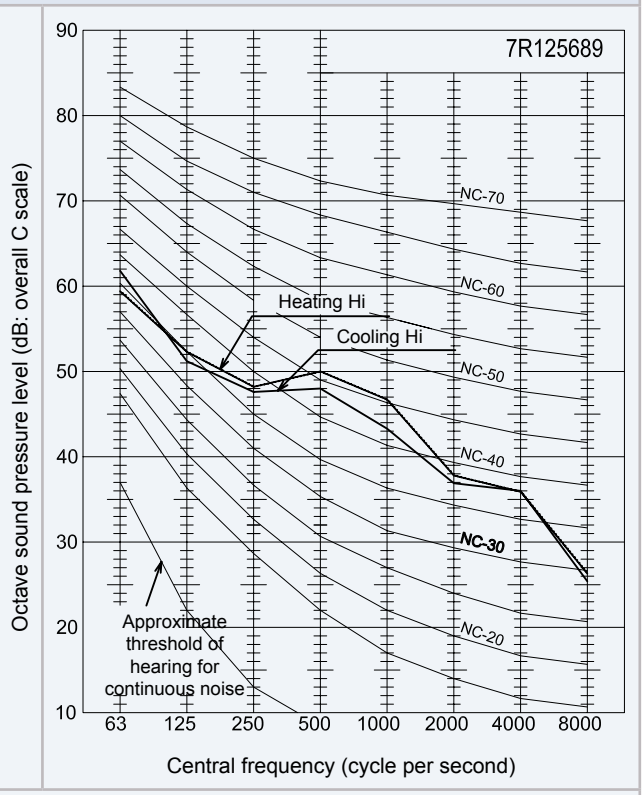
Cooling/Heating: 47/49 dB(A)

RAS-5WH(V)NPE



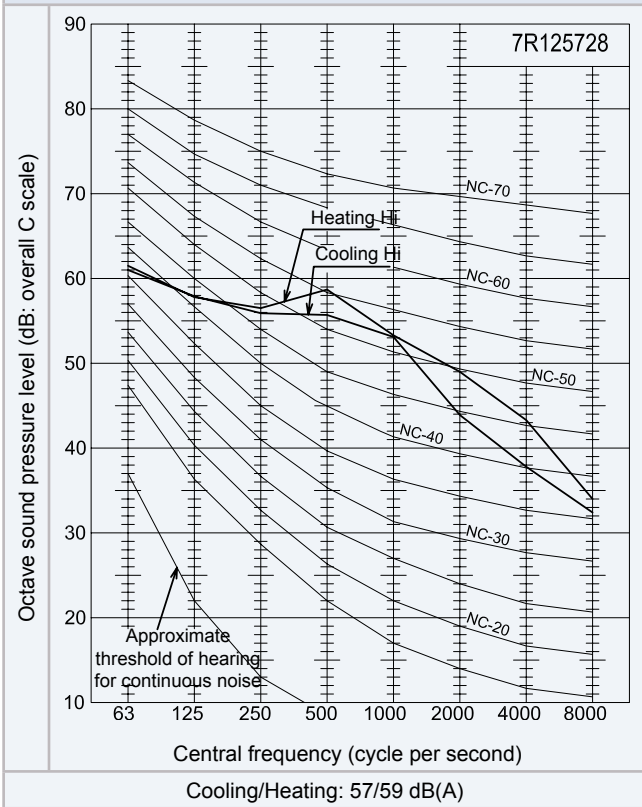
Cooling/Heating: 48/50 dB(A)

RAS-6WH(V)NPE



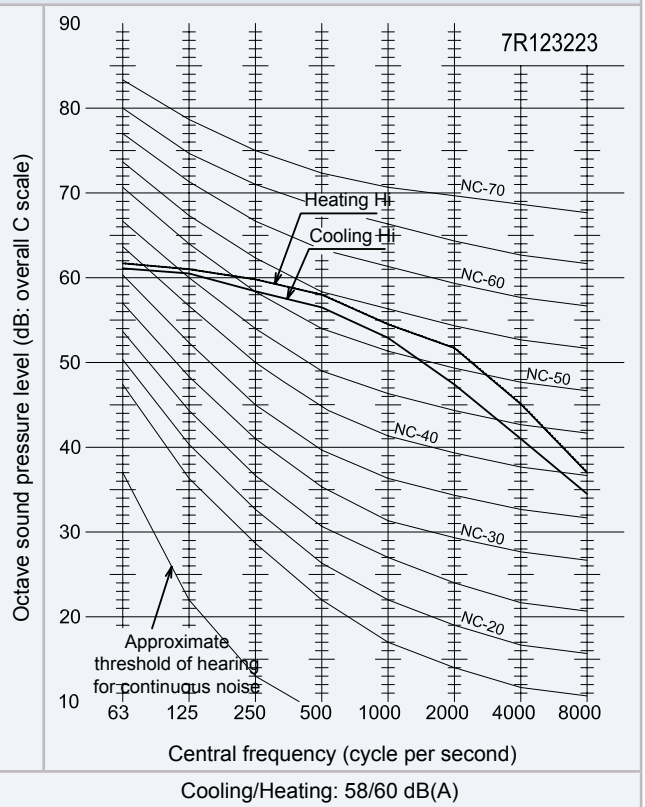
Cooling/Heating: 48/50 dB(A)

RAS-8WHNPE



Cooling/Heating: 57/59 dB(A)

RAS-10WHNPE



Cooling/Heating: 58/60 dB(A)

6. Working range

Index

6.1 Power supply working range 172

6.2 Temperature working range 172

6.2.1 Space heating 172

6.2.2 DHW 174

6.2.3 Swimming pool heating 175

6.2.4 Space cooling (Necessary cooling kit) 175

6.3 Hydraulic working range 176

6.3.1 Hydraulic data 176

6.3.2 Pump performance curves 177

6.1 Power supply working range

◆ Nominal power supply

- Single phase: 1~ 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.

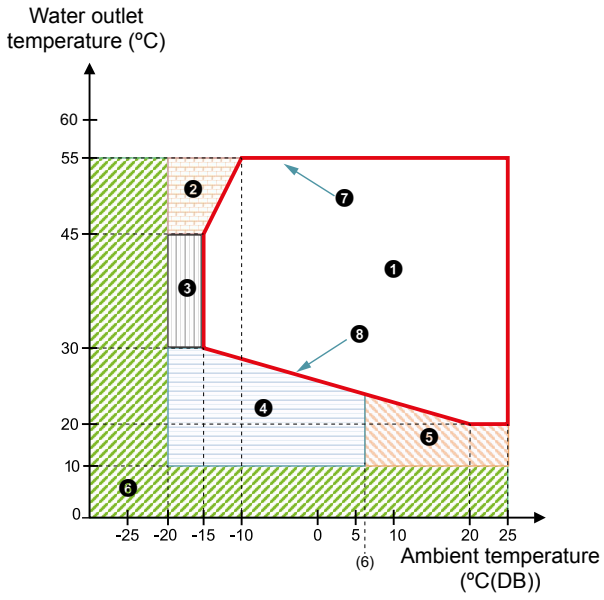
6.2 Temperature working range

MODEL		2.0HP	2.5HP	3.0HP	4.0HP	5.0HP	6.0HP	8.0HP	10.0HP
Water temperature	ºC	Refer to the graphics for each case							
Indoor ambient temperature		5~30							

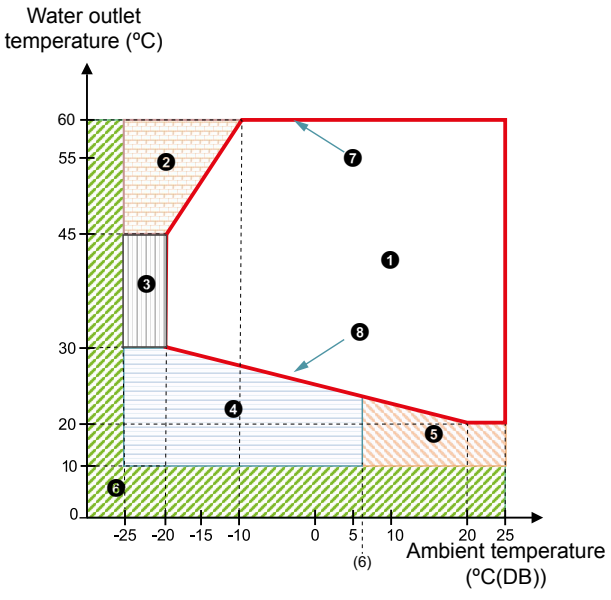
6.2.1 Space heating

◆ YUTAKI (S / S COMBI)

(2.0-3.0)HP



(4.0-10.0)HP

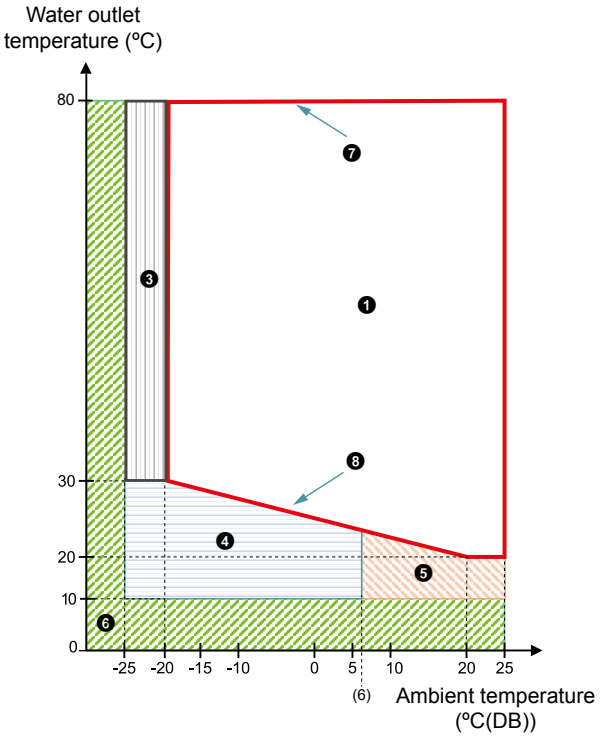


❶ Continuous working range.
❷ Operation not possible.
❸ Heat Pump operation possible.
❹ Starting heat pump + Back-up heater.
❺ Starting Heat Pump.
❻ Starting only Back-up Heater operation.
❼ Maximum setting temperature.
❽ Minimum setting temperature.

NOTE

Items ❹ and ❻ only available if back-up heater is enabled.

◆ YUTAKI S80

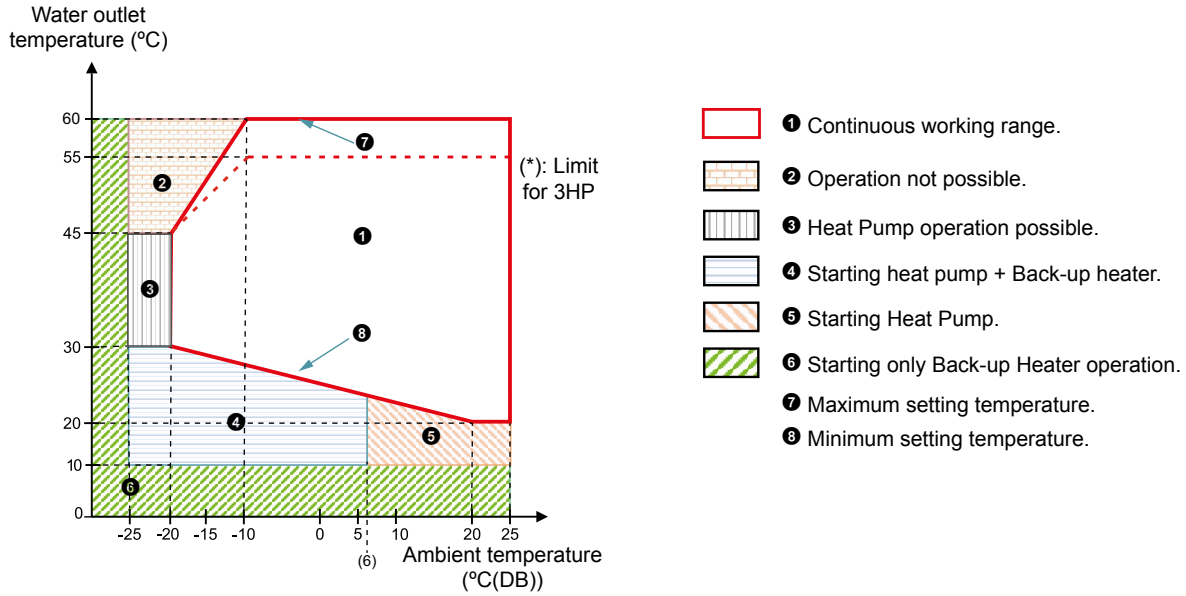


NOTE

Items ❹ and ❻ only available if back-up heater is installed as an accessory.

6

◆ YUTAKI M



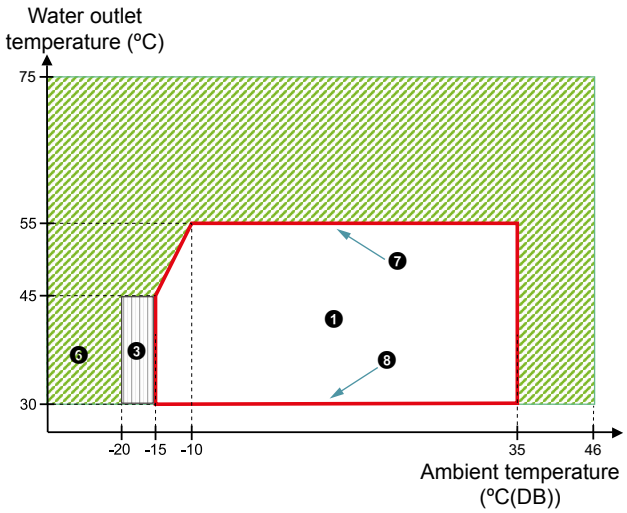
NOTE

Items ❹ and ❻ only available if back-up heater is installed as an accessory

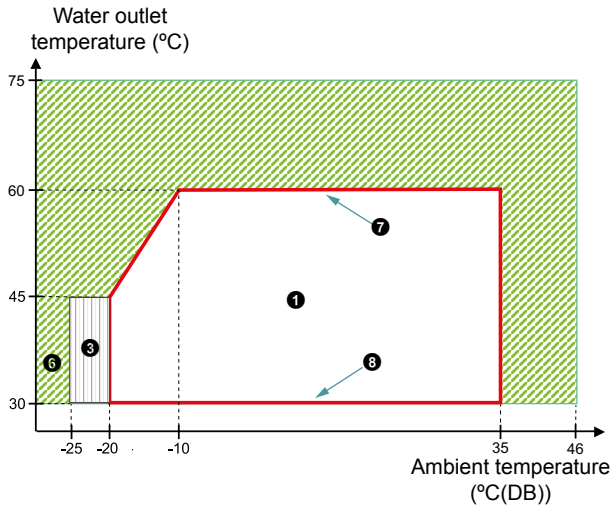
6.2.2 DHW

◆ For YUTAKI (S /S COMBI)

(2.0-3.0)HP



(4.0-10.0)HP

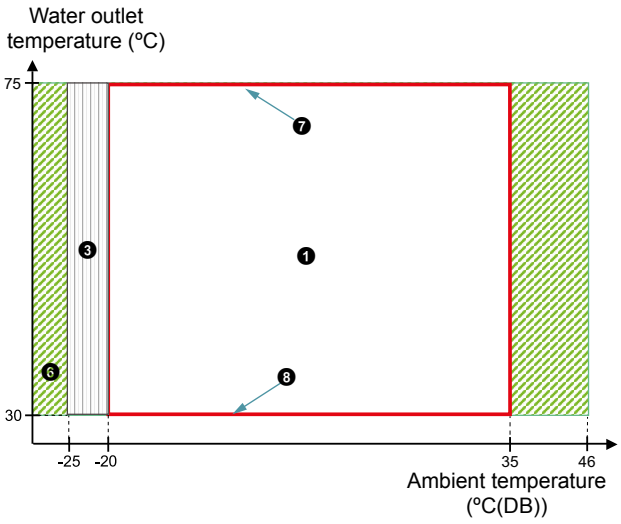


❶ Continuous working range.
❸ Heat Pump operation possible.
❻ Starting only Back-up Heater operation.
❼ Maximum setting temperature.
❽ Minimum setting temperature.

NOTE

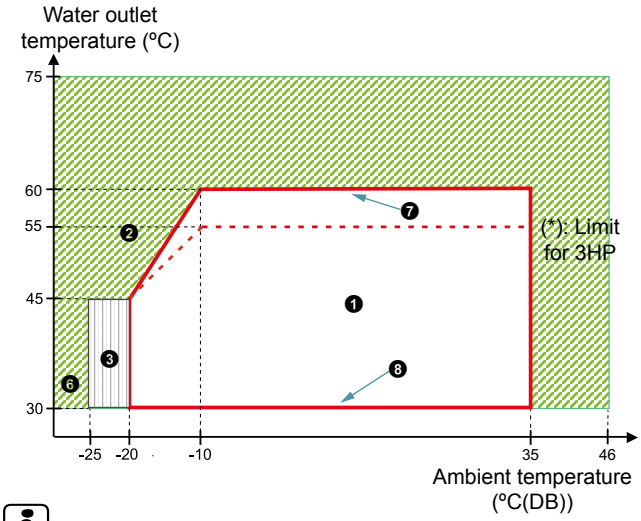
- *The heat pump can produce domestic hot water at 57° C as a maximum (53ºC for 2.0/2.5/3.0HP) by itself, but HITACHI recommends to set the temperature of the tank by heat pump only up to 55° C (50ºC for 2.0/2.5/3.0HP) and keep Thpoff default value. In case of higher setting, the tank's heater must be used to reach the setting temperature (enabled by optional function).*
- *In case of heating up the DHW tank with an outdoor ambient temperature lower than -10 °C and without using the DHW electrical heater, the setting temperature must not exceed the maximum value in the specified continuous working range.*

◆ For YUTAKI S80



❶ Continuous working range.
❸ Heat Pump operation possible.
❻ Starting only Back-up Heater operation.
❼ Maximum setting temperature.
❽ Minimum setting temperature.

◆ For YUTAKI M

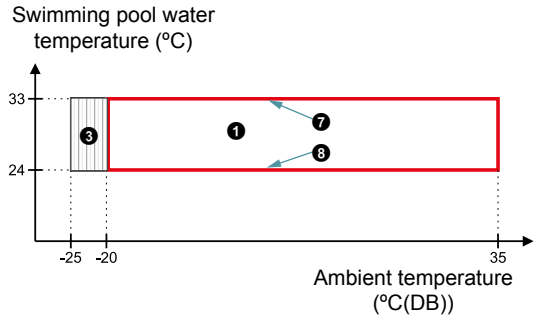


❶ Continuous working range.
❸ Heat Pump operation possible.
❻ Starting only Back-up Heater operation.
❼ Maximum setting temperature.
❽ Minimum setting temperature.

NOTE

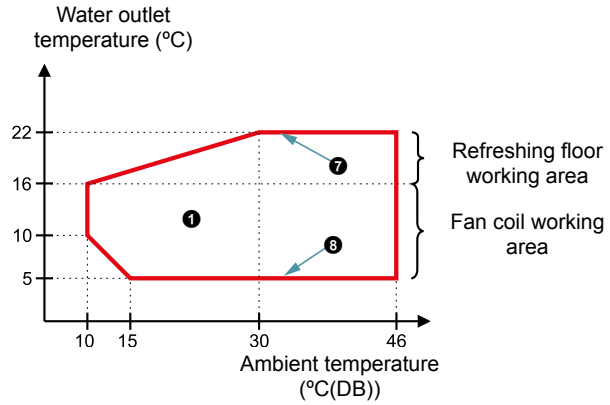
- *The heat pump can produce domestic hot water at 57ºC as a maximum (53ºC for 2.0/2.5/3.0HP) by itself, but HITACHI recommends to set the temperature of the tank by heat pump only up to 55ºC (50ºC for 2.0/2.5/3.0HP) and keep Thpoff default value. In case of higher setting, the tank's heater must be used to reach the setting temperature (enabled by optional function).*
- *In case of heating up the DHW tank with an outdoor ambient temperature lower than -10ºC and without using the DHW electrical heater, the setting temperature must not exceed the maximum value in the specified continuous working range.*

6.2.3 Swimming pool heating



❶ Continuous working range.
❸ Heat Pump operation possible.
❼ Maximum setting temperature.
❽ Minimum setting temperature.

6.2.4 Space cooling (Necessary cooling kit)



❶ Continuous working range.
❼ Maximum setting temperature.
❽ Minimum setting temperature.

6.3 Hydraulic working range

6.3.1 Hydraulic data

◆ YUTAKI S

MODEL		2.0 HP	2.5 HP	3.0 HP	4.0 HP	5.0 HP	6.0 HP	8.0 HP	10.0 HP
Minimum water flow rate (*1)	m^3/h	0.5	0.6	0.6	1.0	1.1	1.2	2.0	2.2
Maximum water flow rate (*1)	m^3/h	1.9	2.0	2.1	2.9	3.0	3.0	4.5	4.6
Minimum installation water volume	l	28	28	28	38	46	55	76	79
Minimum allowable water pressure	MPa	0.1							
Maximum allowable water pressure	MPa	0.3							

◆ YUTAKI S COMBI

MODEL		2.0 HP	2.5 HP	3.0 HP	4.0 HP	5.0 HP	6.0 HP
Minimum water flow rate (*1)	m^3/h	0.5	0.6	0.6	1.0	1.1	1.2
Maximum water flow rate (*1)	m^3/h	1.8	1.9	1.9	2.7	2.8	2.8
Minimum installation water volume	l	28	28	28	38	46	55
Minimum allowable water pressure	MPa	0.1					
Maximum allowable water pressure	MPa	0.3					

◆ YUTAKI S80

MODEL		4.0 HP		5.0 HP		6.0 HP	
		Version for indoor unit alone	Version for combination with DHW tank	Version for indoor unit alone	Version for combination with DHW tank	Version for indoor unit alone	Version for combination with DHW tank
Minimum water flow rate (*1)	m^3/h	1.0		1.1		1.2	
Maximum water flow rate (*1)	m^3/h	2.8	2.5	3.2	2.7	3.2	2.7
Minimum installation water volume	l	40		50		50	
Minimum allowable water pressure	MPa	0.1					
Maximum allowable water pressure	MPa	0.3					

◆ YUTAKI M

MODEL		3.0 HP	4.0 HP	5.0 HP	6.0 HP
Minimum water flow rate (*1)	m^3/h	0.6	1.0	1.1	1.2
Maximum water flow rate (*1)	m^3/h	2.1	2.8	3.0	3.0
Minimum installation water volume	l	28	38	46	55
Minimum allowable water pressure	MPa	0.1			
Maximum allowable water pressure	MPa	0.3			

NOTE

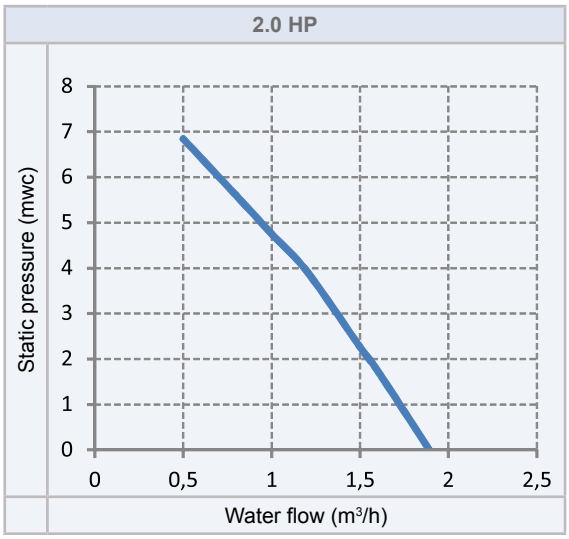
*(*1): Values calculated based on a ΔT (inlet/outlet): 3~8 ºC*

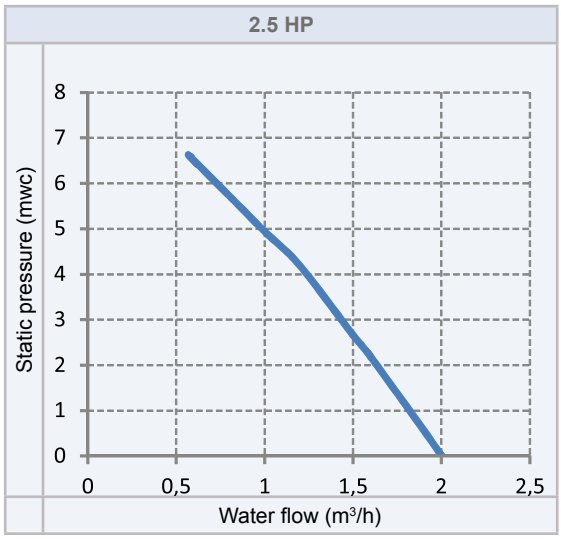
6.3.2 Pump performance curves

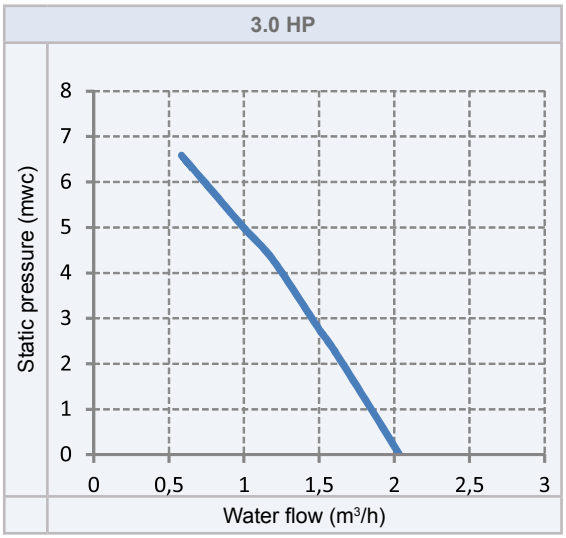
NOTE

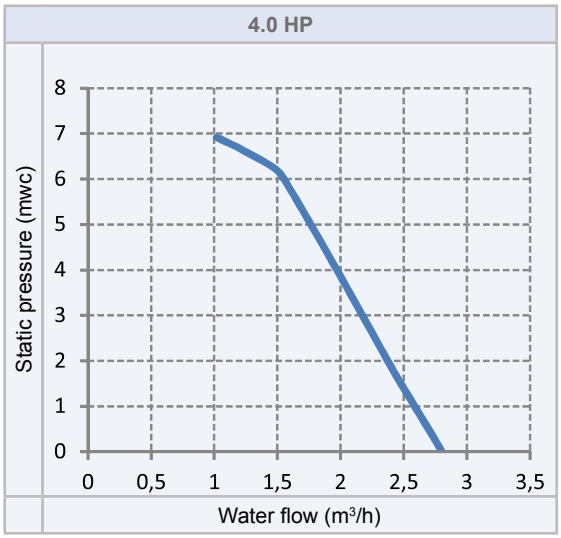
If a water flow rate is selected out of the working range of the unit, it can cause malfunction on the unit. Please, try to operate the pump within the minimum and maximum water flow of the indoor unit.

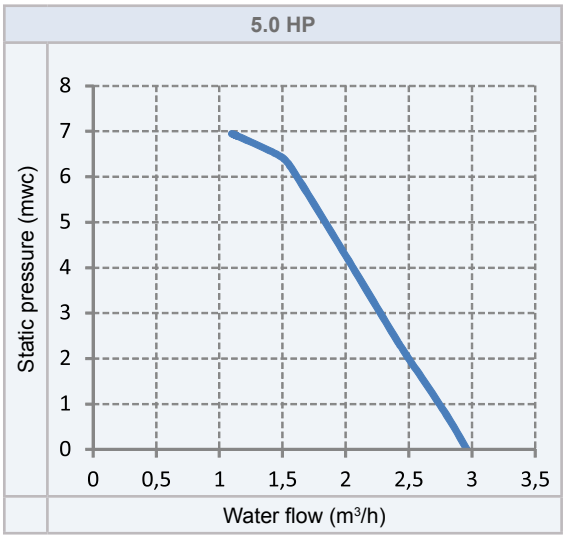
◆ YUTAKI S

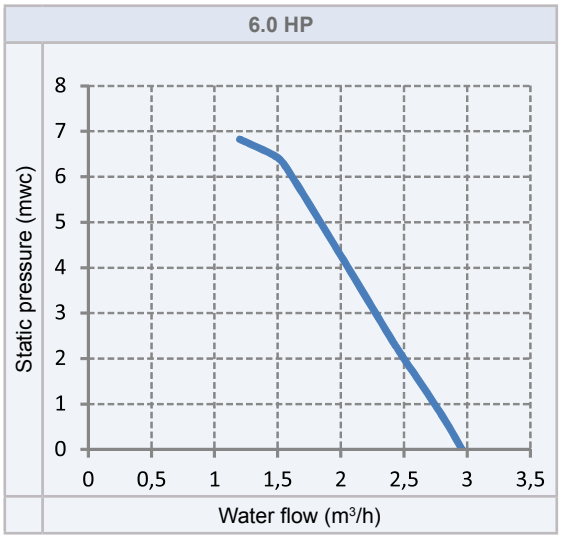


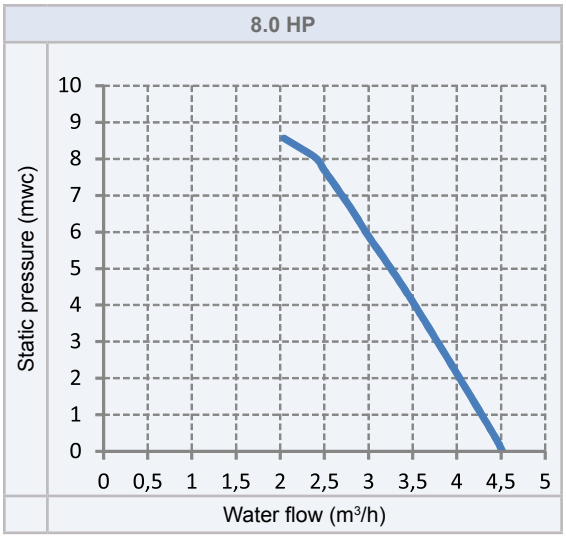


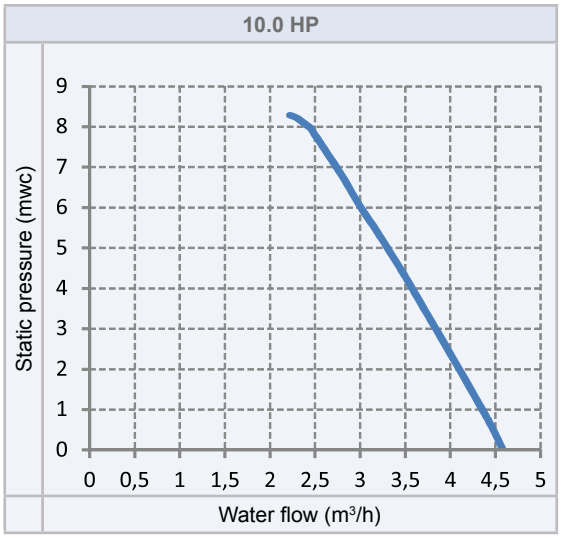




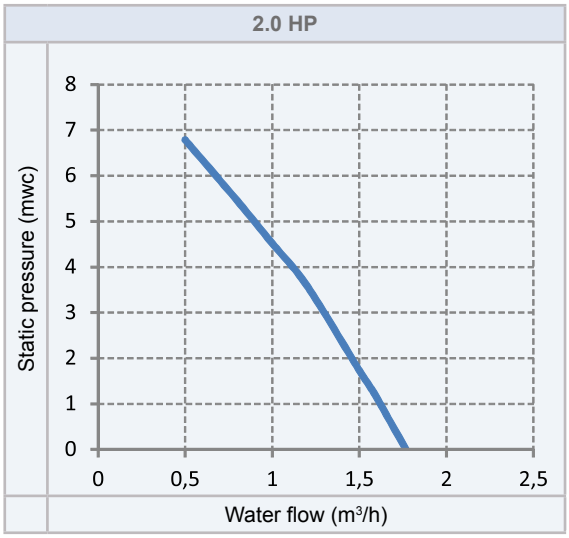

5.0 HP
Static pressure (mwc)
0 1 2 3 4 5 6 7 8
0 0,5 1 1,5 2 2,5 3 3,5
Water flow (m³/h)

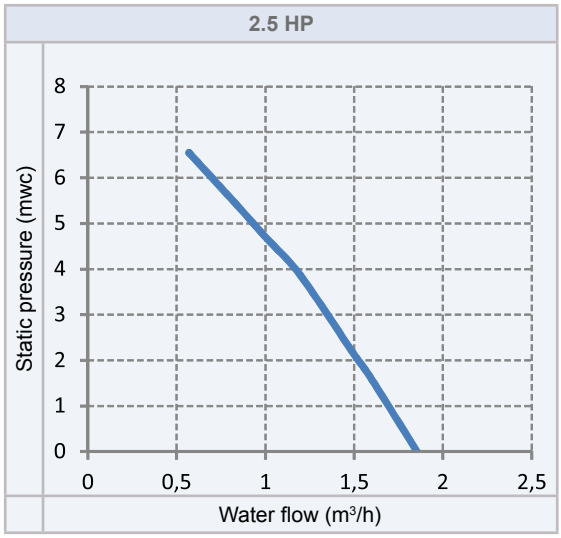

6.0 HP
Static pressure (mwc)
0 1 2 3 4 5 6 7 8
0 0,5 1 1,5 2 2,5 3 3,5
Water flow (m³/h)

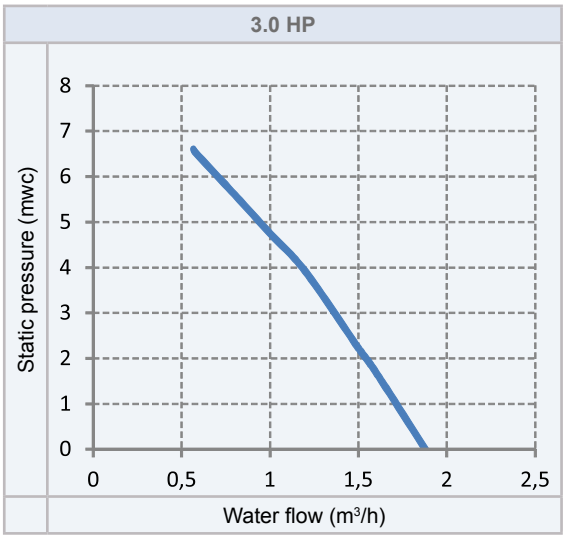

8.0 HP
Static pressure (mwc)
0 1 2 3 4 5 6 7 8 9 10
0 0,5 1 1,5 2 2,5 3 3,5 4 4,5 5
Water flow (m³/h)

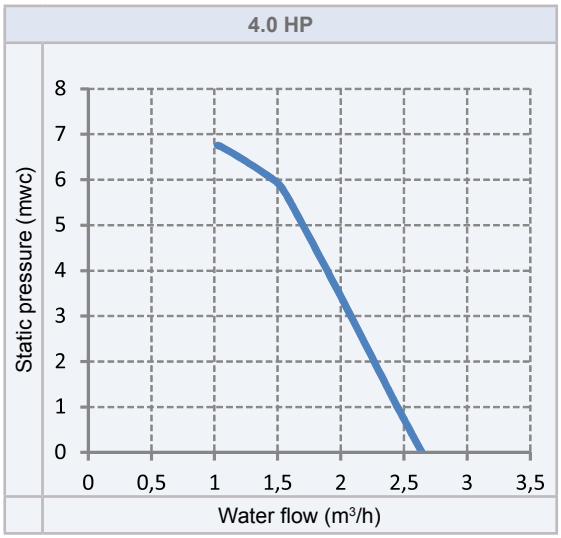

10.0 HP
Static pressure (mwc)
0 1 2 3 4 5 6 7 8 9
0 0,5 1 1,5 2 2,5 3 3,5 4 4,5 5
Water flow (m³/h)

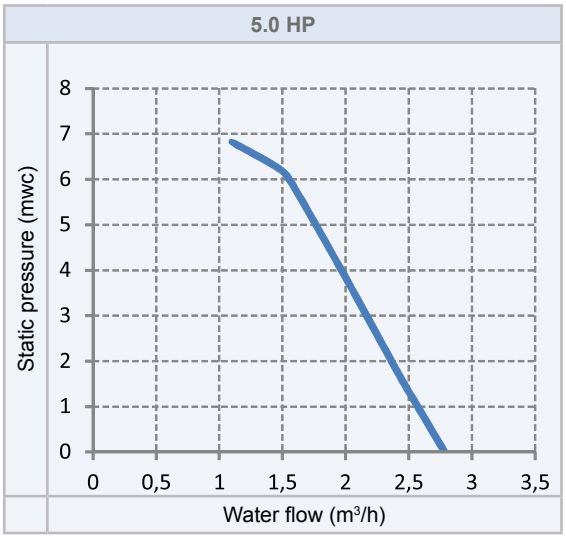
◆ YUTAKI S COMBI

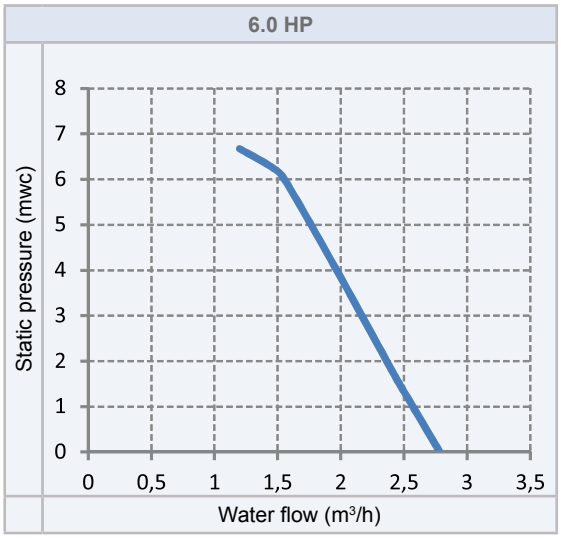






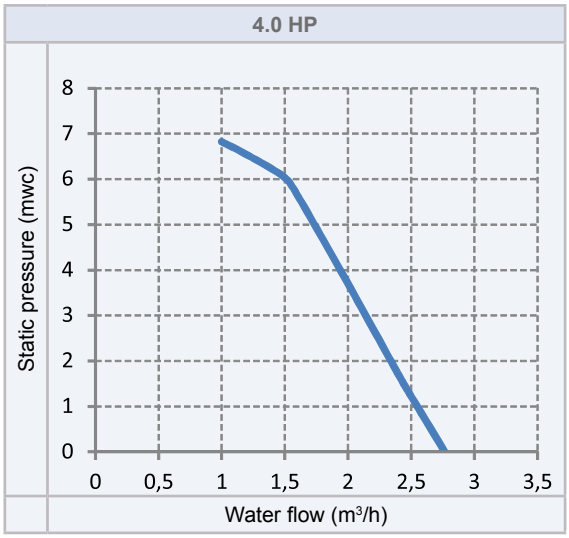


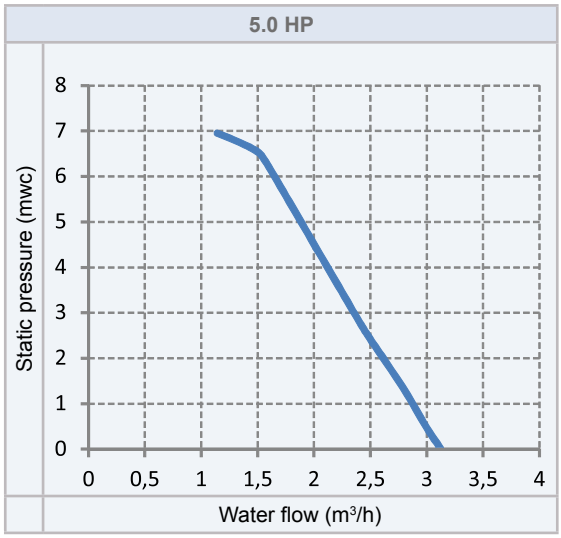


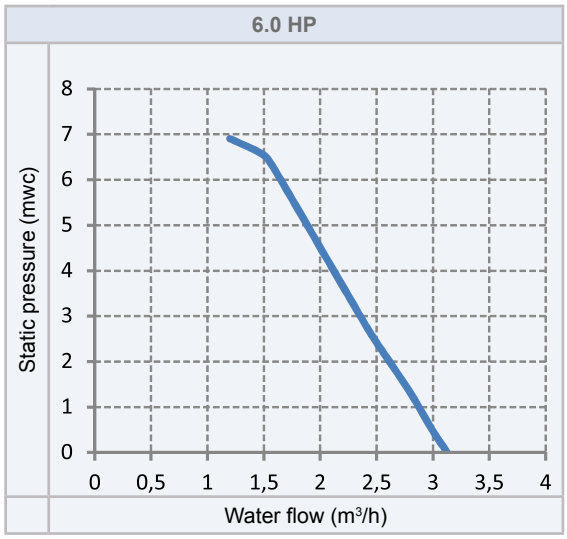


◆ YUTAKI S80

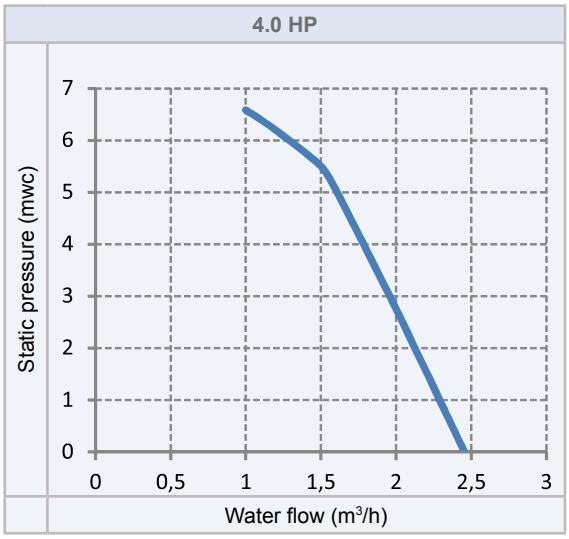
Version for indoor unit alone

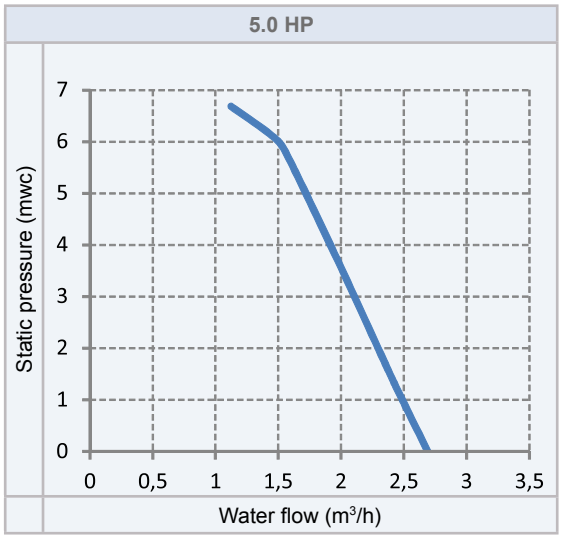


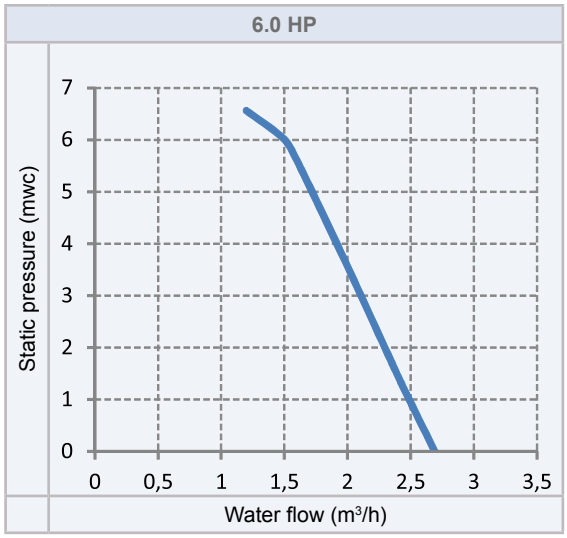




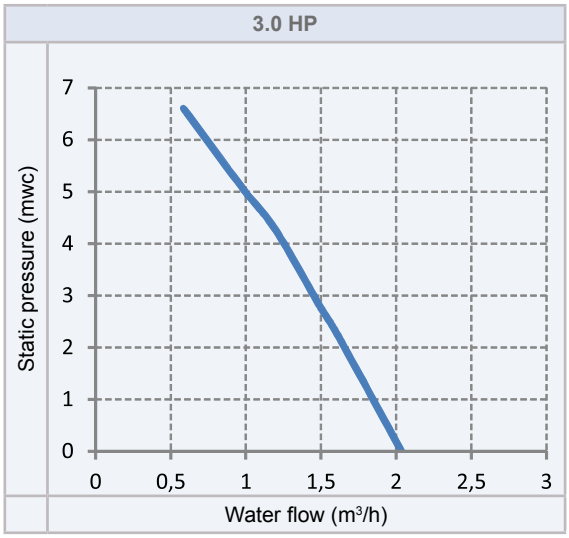
Version for combination with DHW tank

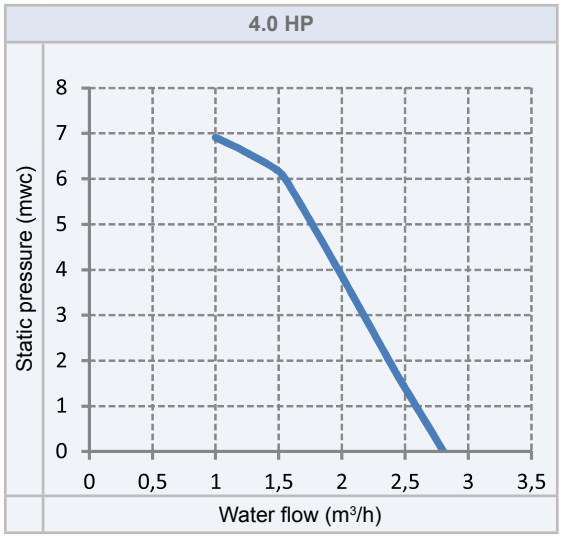


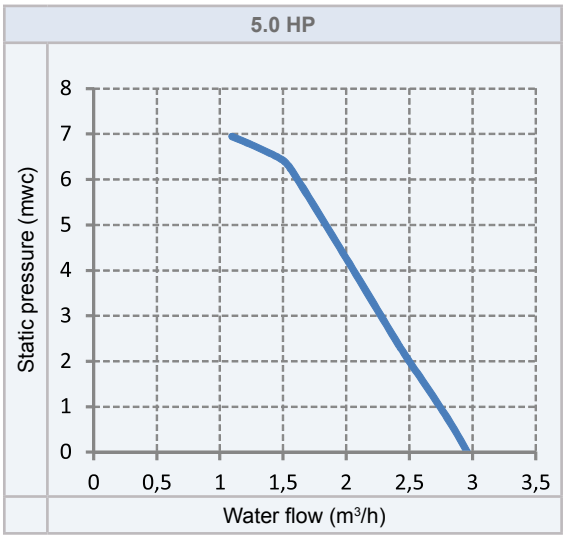


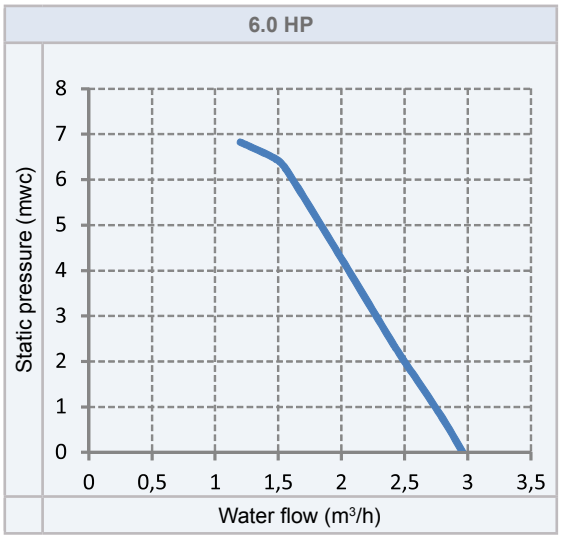


◆ YUTAKI M


3.0 HP
Static pressure (mwc)
0
1
2
3
4
5
6
7
0
0,5
1
1,5
2
2,5
3
Water flow (m³/h)


4.0 HP
Static pressure (mwc)
0
1
2
3
4
5
6
7
8
0
0,5
1
1,5
2
2,5
3
3,5
Water flow (m³/h)


5.0 HP
Static pressure (mwc)
0
1
2
3
4
5
6
7
8
0
0,5
1
1,5
2
2,5
3
3,5
Water flow (m³/h)


6.0 HP
Static pressure (mwc)
0
1
2
3
4
5
6
7
8
0
0,5
1
1,5
2
2,5
3
3,5
Water flow (m³/h)

7. General dimensions

Index

7.1 Name of parts and Dimensional data 184

7.1.1 Split system - Outdoor unit 184

7.1.2 Split system - Indoor unit 186

7.1.2.1 YUTAKI S 186

7.1.2.2 YUTAKI S COMBI 189

7.1.2.3 YUTAKI S80 194

7.1.3 Monobloc system - YUTAKI M 197

7.1.4 Complementary system 199

7.1.4.1 YUTAKI CASCADE CONTROLLER 199

7.2 Service space 200

7.2.1 Split system - Outdoor unit 200

7.2.2 Split system - Indoor unit 201

7.2.2.1 YUTAKI S 201

7.2.2.2 YUTAKI S COMBI 201

7.2.2.3 YUTAKI S80 202

7.2.3 Monobloc system - YUTAKI M 205

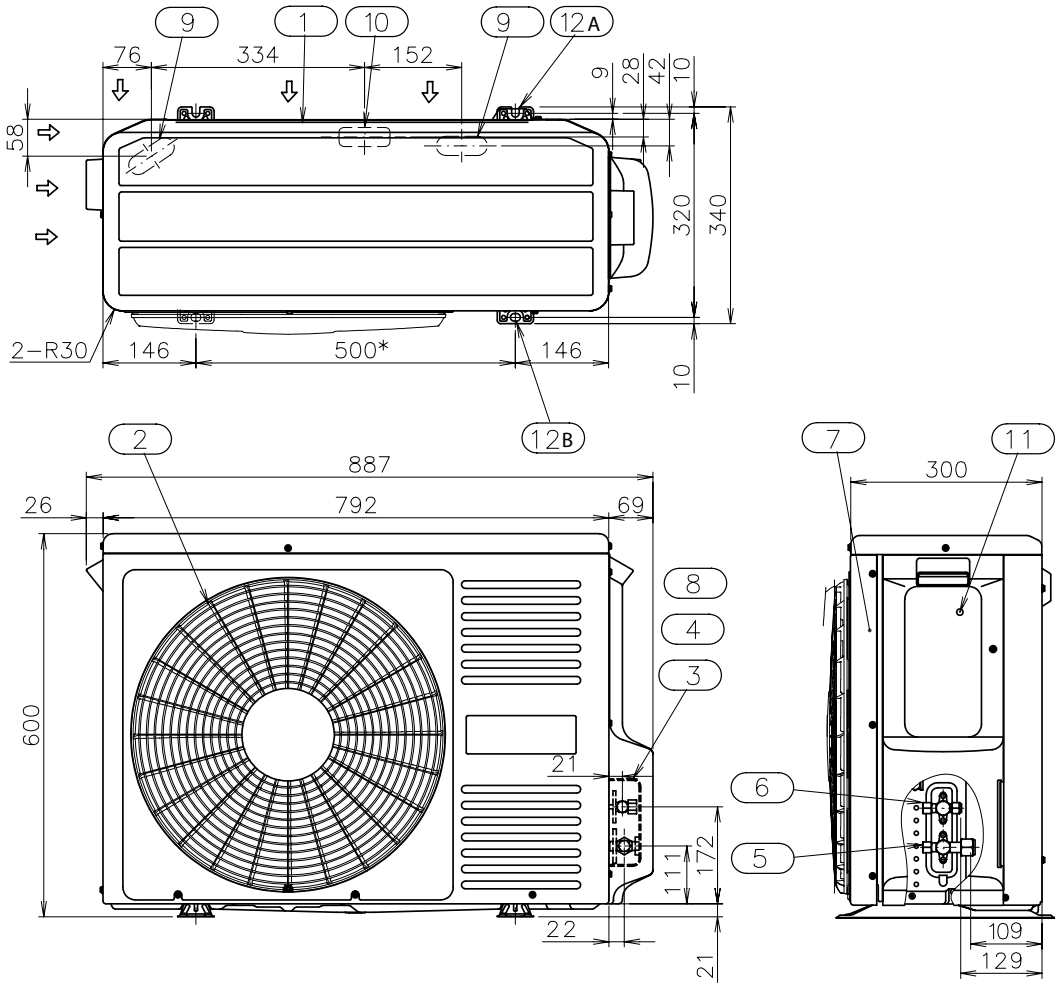
7.2.4 Complementary system 205

7.2.4.1 YUTAKI CASCADE CONTROLLER 205

7.1 Name of parts and Dimensional data

7.1.1 Split system - Outdoor unit

◆ RAS-(2-3)WHVNP

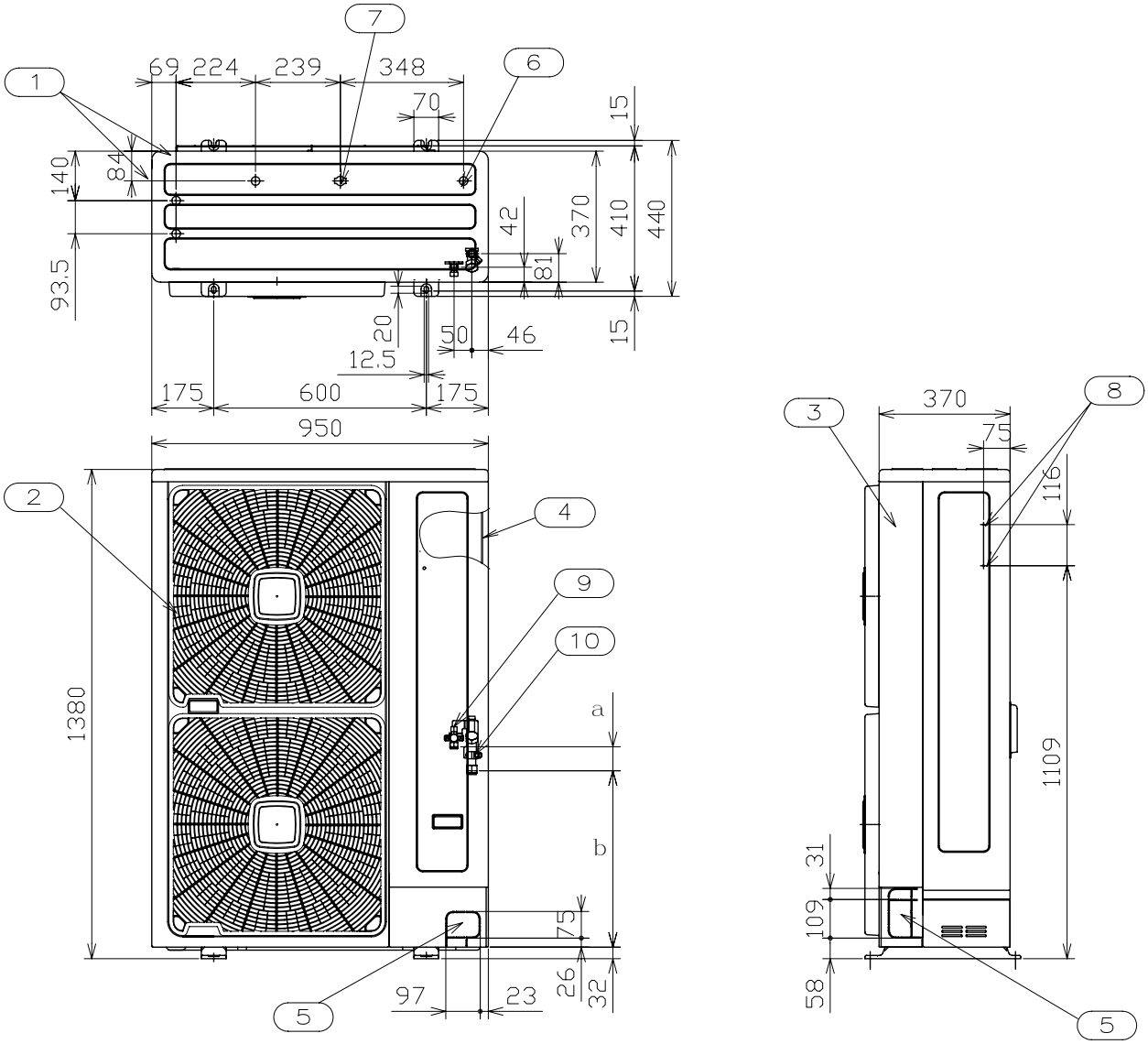


Units: mm

Nº	Description	Remarks
1	Air inlet	—
2	Air outlet	—
3	Holes for power supply wiring	—
4	Holes for control line wiring	—
5	Gas piping connection	—
6	Liquid piping connection	—
7	Service panel	—
8	Refrigerant piping hole	—
9	Drain hole	—
10	Drain hole	—
11	Earth terminal wiring	(M5)
12	Holes for fixing machine to wall	A: 2-U cut holes / B: 2 - holes



◆ RAS-(4-6)WH(V)NPE/ RAS-(8/10)WHNPE



Units in: mm

Nº	Description	Remarks
1	Air inlet	—
2	Air outlet	—
3	Service cover	—
4	Electrical switch box	—
5	Holes for refrigerant piping and electrical wiring piping	—
6	Drain holes	3-Ø24
7	Drain holes	2-Ø26
8	Holes for fixing machine to wall	4-(M5)
9	Refrigerant liquid pipe	—
10	Refrigerant gas pipe	—

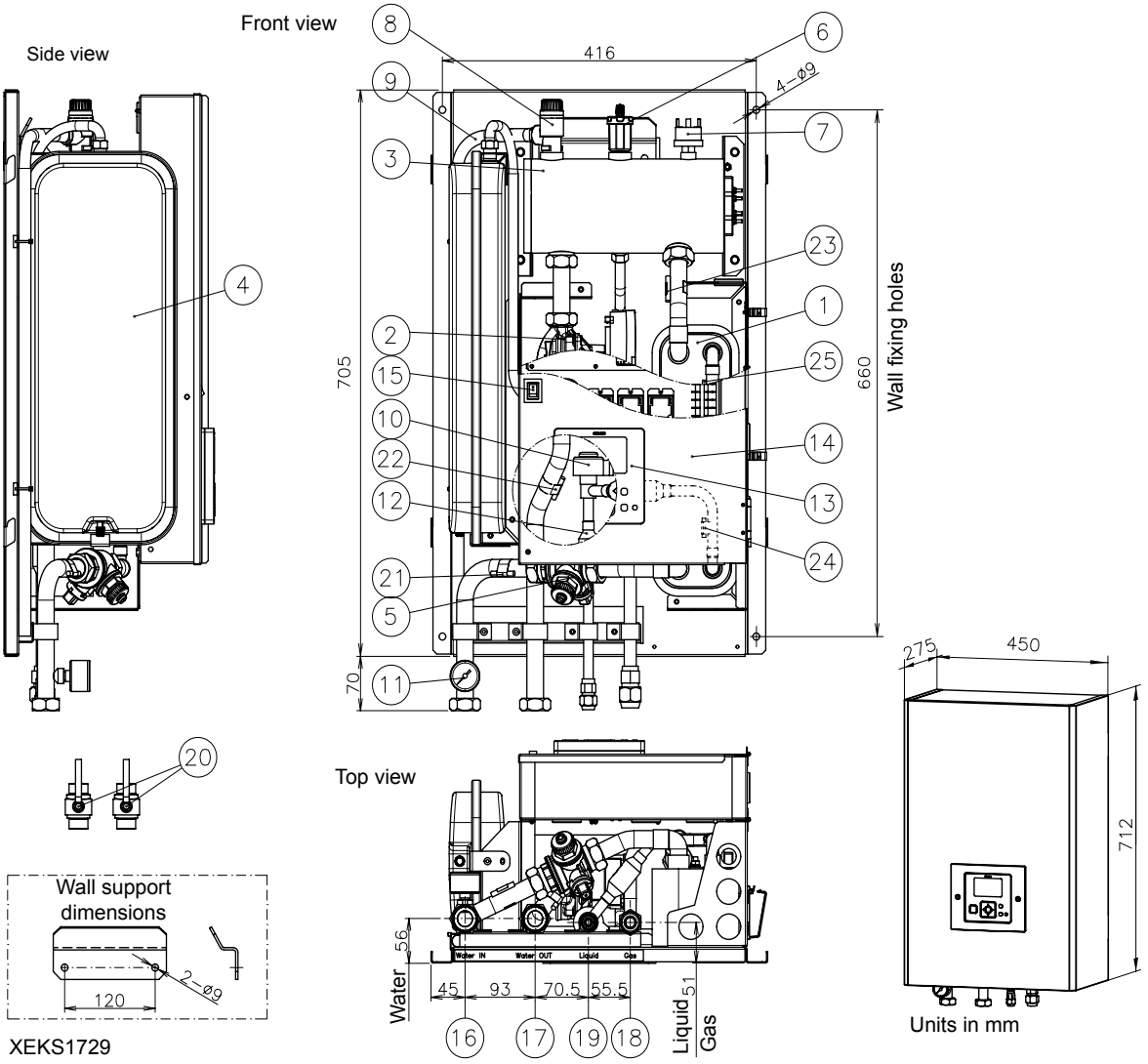


	4-6 HP	8 HP	10 HP
a	90	81	99
b	459	465	465

7.1.2 Split system - Indoor unit

7.1.2.1 YUTAKI S

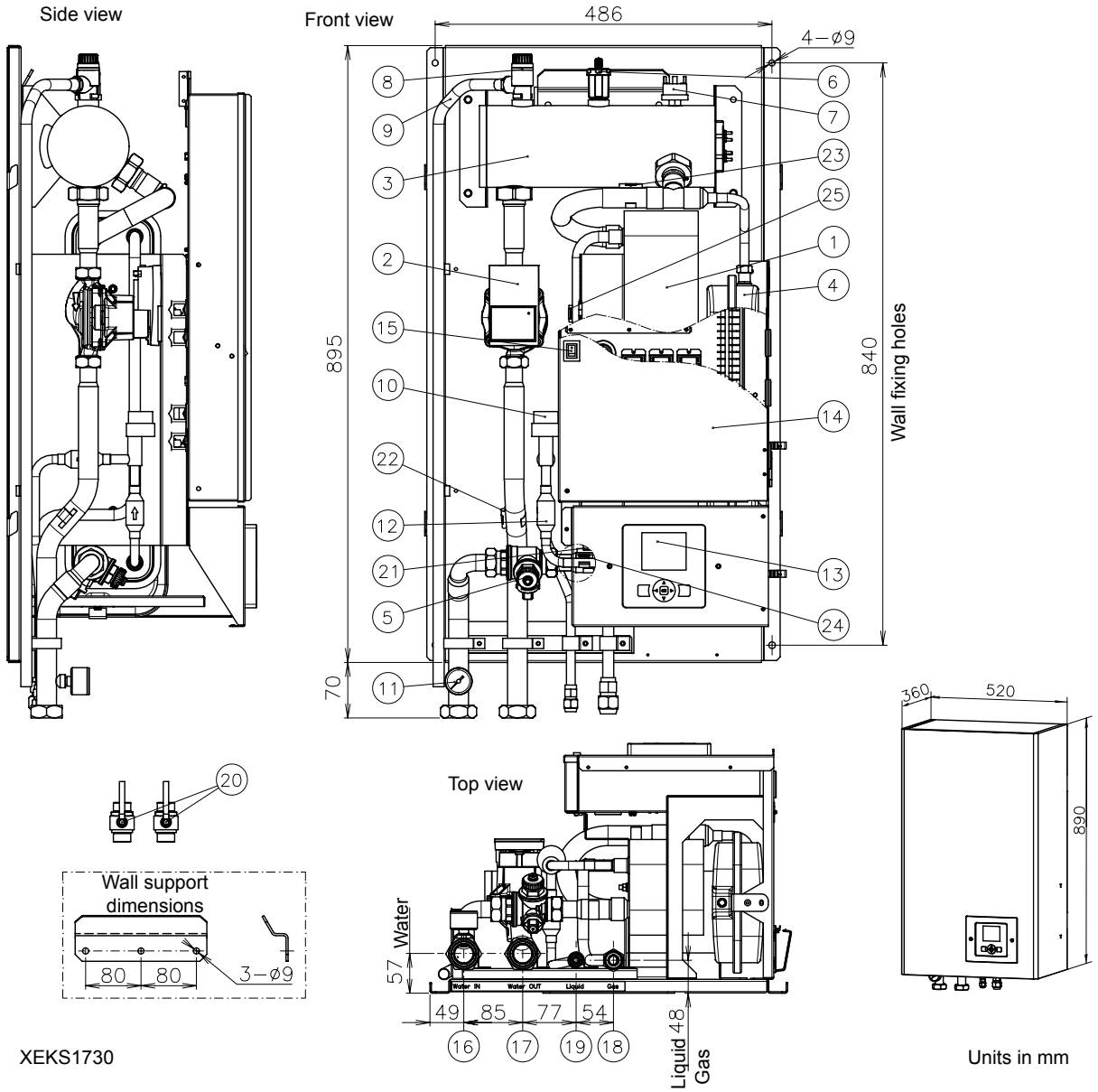
◆ **RWM-(2.0-3.0)NE(-W)**



Nº	Part name	Nº	Part name
1	Plate heat exchanger	13	Unit controller (Except (-W) models)
2	Water pump	14	Electrical box
3	Electric water heater	15	Switch for DHW emergency operation
4	Expansion vessel 6L	16	Water inlet pipe connection - G 1” Female
5	Water strainer	17	Water outlet pipe connection - G 1” Female
6	Air purger	18	Refrigerant gas pipe connection - Ø15.88 (5/8”)
7	Water low pressure switch	19	Refrigerant liquid pipe connection 2.0HP: Ø6.35 (1/4”) 2.5/3.0HP: Ø9.52 (3/8”)
8	Safety valve	20	Shut-off valve (Factory-supplied accessory)
9	Drain pipe for safety valve	21	Thermistor (Water inlet pipe)
10	Expansion valve	22	Thermistor (Water outlet pipe)
11	Manometer	23	Thermistor (Water outlet PHEX)
12	Refrigerant strainer (x2)	24	Thermistor (Liquid refrigerant pipe)
		25	Thermistor (Gas refrigerant pipe)



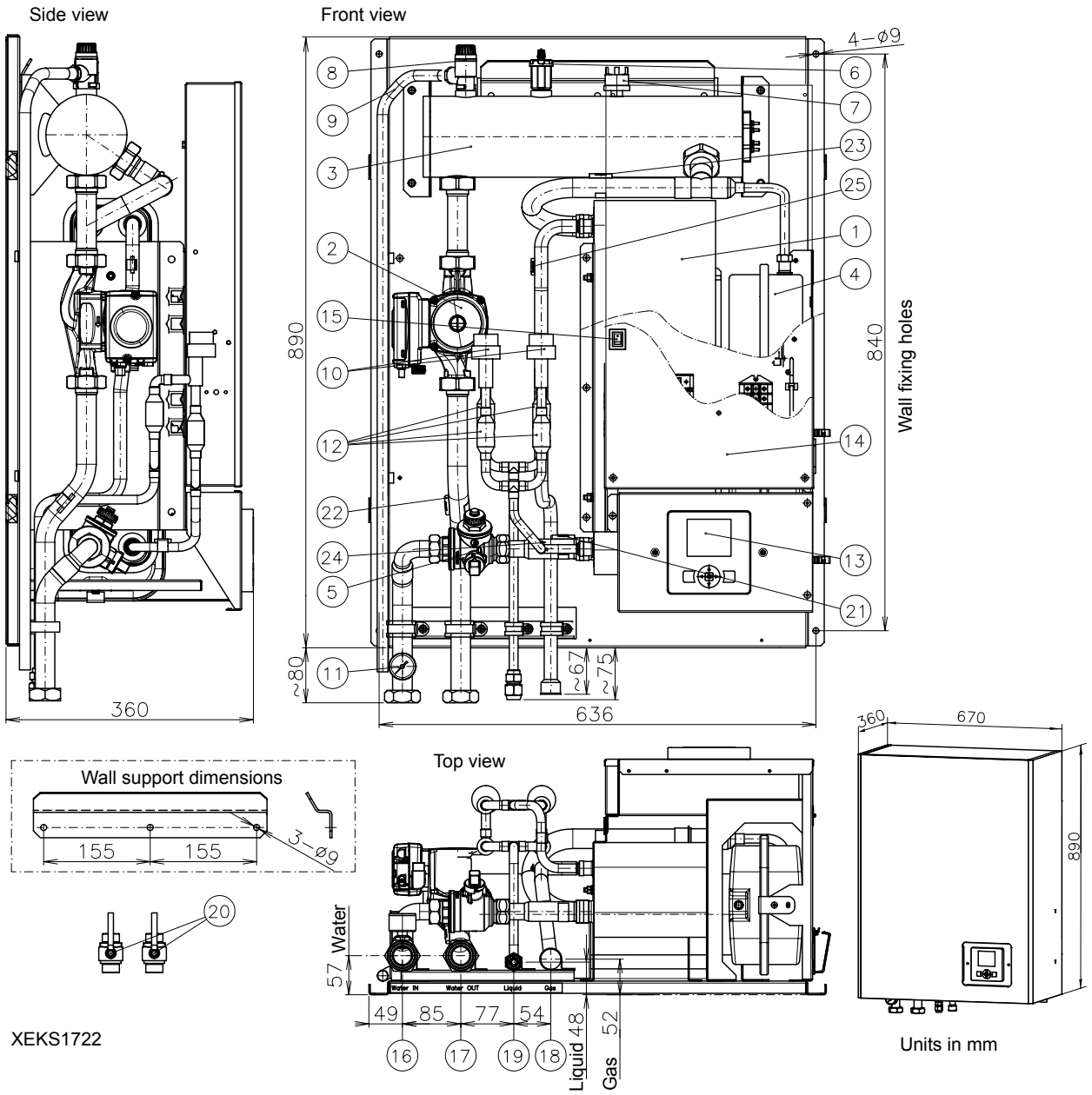
◆ RWM-(4.0-6.0)NE(-W)



Nº	Part name	Nº	Part name
1	Plate heat exchanger	13	Unit controller (Except (-W) models)
2	Water pump	14	Electrical box
3	Electric water heater	15	Switch for DHW emergency operation
4	Expansion vessel 6L	16	Water inlet pipe connection - G 1 1/4” female
5	Water strainer	17	Water outlet pipe connection - G 1 1/4” female
6	Air purger	18	Refrigerant gas pipe connection - Ø 15.88 (5/8”)
7	Water low pressure switch	19	Refrigerant liquid pipe - Ø 9.52 (3/8”)
8	Safety valve	20	Shut-off valve (Factory supplied accessory)
9	Drain pipe for safety valve	21	Thermistor (Water inlet pipe)
10	Expansion valve (x2)	22	Thermistor (Water outlet pipe)
11	Manometer	23	Thermistor (Water outlet PHEX)
12	Refrigerant strainer	24	Thermistor (Liquid refrigerant pipe)
		25	Thermistor (Gas refrigerant pipe)



◆ RWM-(8.0/10.0)NE(-W)



Nº	Part name	Nº	Part name
1	Plate heat exchanger	13	Unit controller (Except (-W) models)
2	Water pump	14	Electrical box
3	Electric water heater	15	Switch for DHW emergency operation
4	Expansion vessel 10L	16	Water inlet pipe connection - G 1 1/4” Female
5	Water strainer	17	Water outlet pipe connection - G 1 1/4” Female
6	Air purger	18	Refrigerant gas pipe connection - Ø25.4 (1”)
7	Water low pressure switch	19	Refrigerant liquid pipe connection 8HP: Ø9.52 (3/8”) 10HP: Ø12.7 (1/2”)
8	Safety valve	20	Shut-off valve (factory-supplied accessory)
9	Drain pipe for safety valve	21	Thermistor (Water inlet pipe)
10	Expansion valve (x2)	22	Thermistor (Water outlet pipe)
11	Manometer	23	Thermistor (Water outlet PHEX)
12	Refrigerant strainer (x4)	24	Thermistor (Liquid refrigerant pipe)
		25	Thermistor (Gas refrigerant pipe)

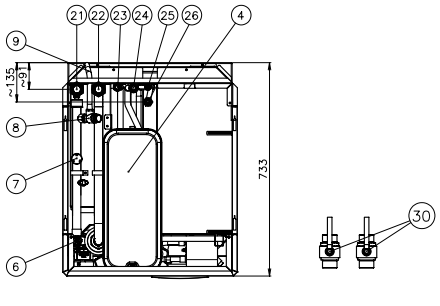


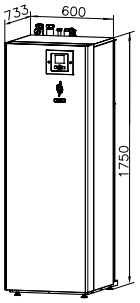
7.1.2.2 YUTAKI S COMBI

◆ Standard model

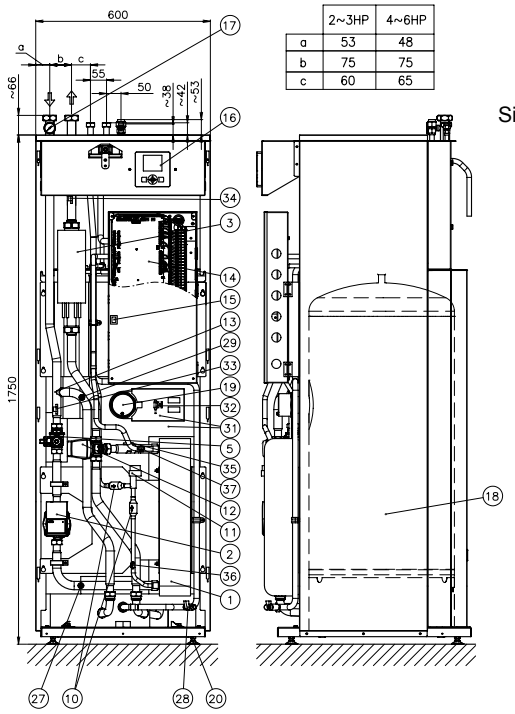
RWD-(2.0-6.0)NWE-200S(-W)

Top view





Front view



	2~3HP	4~6HP
a	53	48
b	75	75
c	60	65

Side view

XEKS1723

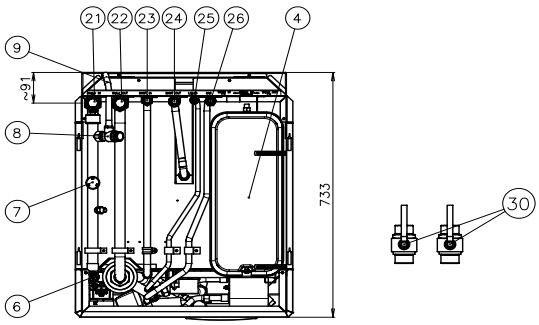
Units in: mm

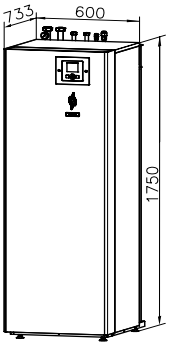
Nº	Part name	Nº	Part name
1	Plate heat exchanger	20	Mounting foot (x4)
2	Water pump	21	Water inlet pipe connection 2.0-3.0HP: G 1” female / 4.0-6.0HP: G1 1/4” female
3	Electric water heater	22	Water outlet pipe connection 2.0-3.0HP: G 1” female / 4.0-6.0HP: G1 1/4” female
4	Expansion vessel 6L	23	DHW inlet pipe connection - G 3/4” female
5	Water strainer	24	DHW outlet pipe connection - G 3/4” female
6	Air purger	25	Refrigerant liquid pipe connection 2.0HP: Ø 6.35 (1/4”) / 2.5~6HP: Ø9.52 (3/8”)
7	Low water pressure switch		
8	Safety valve	26	Refrigerant gas pipe connection - Ø15.88 (5/8”)
9	Drain pipe for safety valve	27	Drain port (For indoor unit water) - G 3/8”
10	Refrigerant strainer (x2)	28	Drain port (For DHW) - G 3/8”
11	Expansion valve	29	Manual air purger
12	3-way valve (for space heating and DHW)	30	Shutdown valve (Factory supplied accessory)
13	T-branch (for space heating and DHW)	31	Tank insulation
14	Electrical box	32	DHW thermistor
15	Switch for DHW emergency operation	33	Water inlet thermistor
16	Unit controller (Except (-W) models)	34	Water outlet thermistor
17	Manometer	35	Water outlet PHEX thermistor
18	DHW tank (200L)	36	Refrigerant liquid pipe thermistor
19	DHW tank heater+thermostat	37	Refrigerant gas pipe thermistor



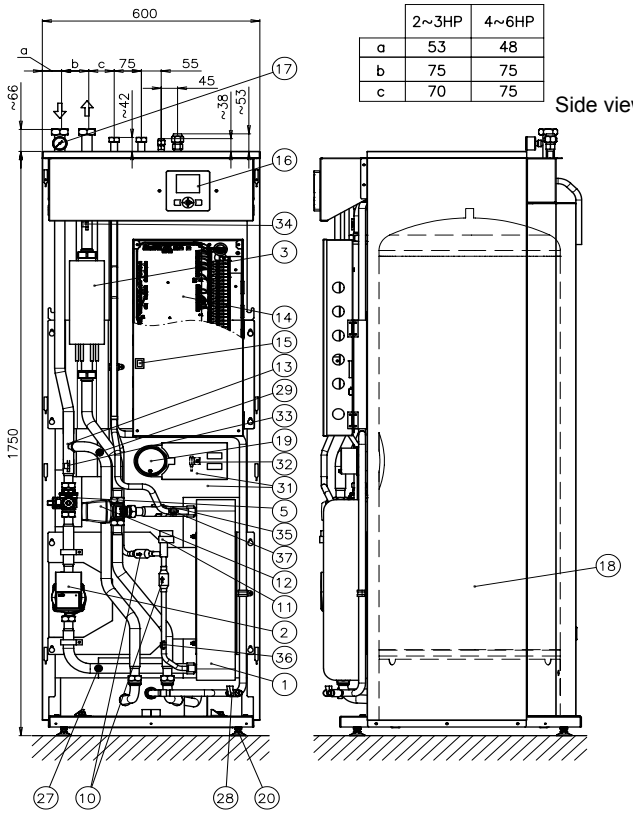
RWD-(2.0-6.0)NWE-260S(-W)

Top view





Front view



	2~3HP	4~6HP
a	53	48
b	75	75
c	70	75

Side view

XEKS1724

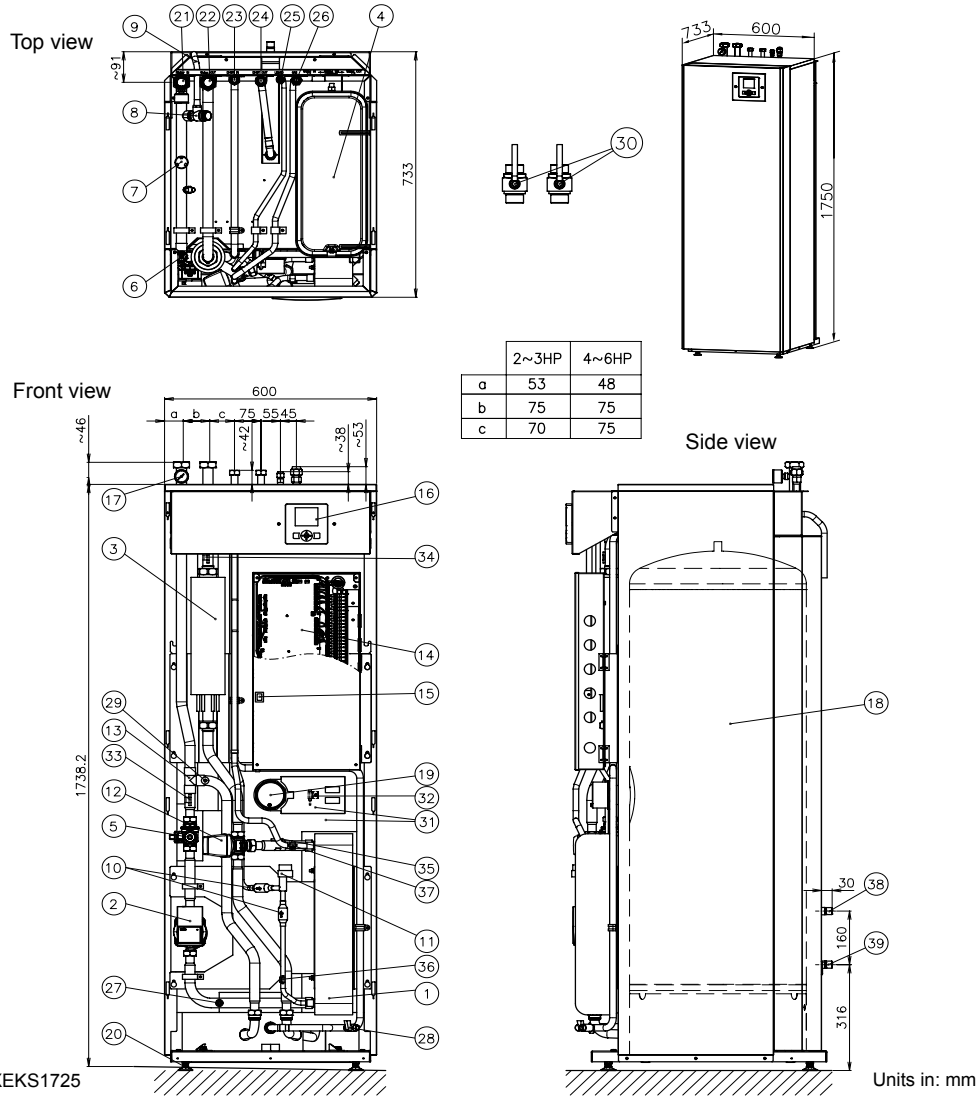
Units in: mm

Nº	Part name	Nº	Part name
1	Plate heat exchanger	20	Mounting foot (x4)
2	Water pump	21	Water inlet pipe connection 2.0-3.0HP: G 1” female / 4.0-6.0HP: G1 1/4” female
3	Electric water heater	22	Water outlet pipe connection 2.0-3.0HP: G 1” female / 4.0-6.0HP: G1 1/4” female
4	Expansion vessel 6L	23	DHW inlet pipe connection - G 3/4” female
5	Water strainer	24	DHW outlet pipe connection - G 3/4” female
6	Air purger	25	Refrigerant liquid pipe connection 2HP: Ø6.35 (1/4”)/2.5~6HP: Ø9.52 (3/8”)
7	Low water pressure switch		
8	Safety valve	26	Refrigerant gas pipe connection - Ø15.88 (5/8”)
9	Drain pipe for safety valve	27	Drain port (For indoor unit water) - G 3/8”
10	Refrigerant strainer	28	Drain port (For DHW) - G 3/8”
11	Expansion valve	29	Manual air purger
12	3-way valve (for space heating and DHW)	30	Shutdown valve (Factory supplied accessory)
13	T-branch (for space heating and DHW)	31	Tank insulation
14	Electrical box	32	DHW thermistor
15	Switch for DHW emergency operation	33	Water inlet thermistor
16	Unit controller (Except (-W) models)	34	Water outlet thermistor
17	Manometer	35	Water outlet PHEX thermistor
18	DHW tank (260L)	36	Refrigerant liquid pipe thermistor
19	DHW tank heater+thermostat	37	Refrigerant gas pipe thermistor



◆ Model for solar combination

RWD-(2.0-6.0)NWSE-260S(-W)



	2~3HP	4~6HP
a	53	48
b	75	75
c	70	75

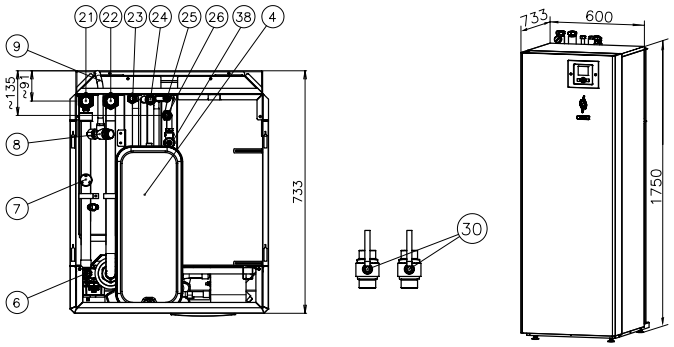
Nº	Part name	Nº	Part name
1	Plate heat exchanger	21	Water inlet pipe connection 2.0-3.0HP: G 1” female / 4.0-6.0HP: G1 1/4” female
2	Water pump	22	Water outlet pipe connection 2.0-3.0HP: G 1” female / 4.0-6.0HP: G1 1/4” female
3	Electric water heater	23	DHW inlet pipe connection - G 1/4” female
4	Expansion vessel 6L	24	DHW outlet pipe connection - G 1/4” female
5	Water strainer	25	Refrigerant liquid pipe connection 2.0HP: Ø6.35(1/4”)-2.5~6.0HP: Ø9.52(1/4”)
6	Air purger	26	Refrigerant gas pipe connection Ø15.88 (5/8”)
7	Low water pressure switch	27	Drain port (for indoor unit water)- G3/8”
8	Safety valve	28	Drain port (for DHW)- G3/8”
9	Drain pipe for safety valve	29	Manual air purger
10	Refrigerant strainer (x2)	30	Shutdown valve (Factory supplied)
11	Expansion valve	31	Tank insulation
12	3-way valve (for space heating and DHW)	32	DHW thermistor
13	T-branch (for space heating and DHW)	33	Water inlet thermistor
14	Electrical box	34	Water outlet thermistor
15	Switch for DHW “emergency” operation	35	Water outlet PHEX thermistor
16	Unit controller (Except (-W) models)	36	Refrigerant liquid pipe thermistor
17	Manometer	37	Refrigerant gas pipe thermistor
18	DHW tank (260L)	38	Solar coil inlet connection
19	DHW tank heater + thermostat	39	Solar coil outlet connection
20	Mounting foot (x4)		



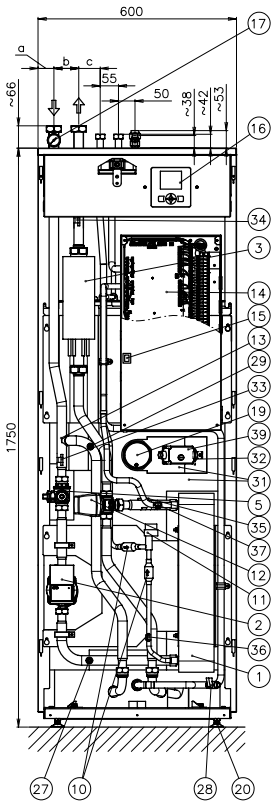
◆ Model for UK market

RWD-(2.0-6.0)NWSE-200S-K

Top view

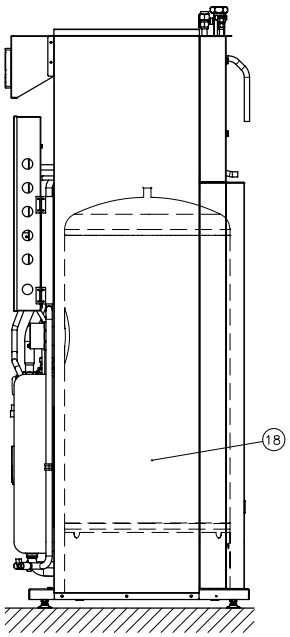


Front view



	2~3HP	4~6HP
a	53	48
b	75	75
c	60	65

Side view



XEKS1755

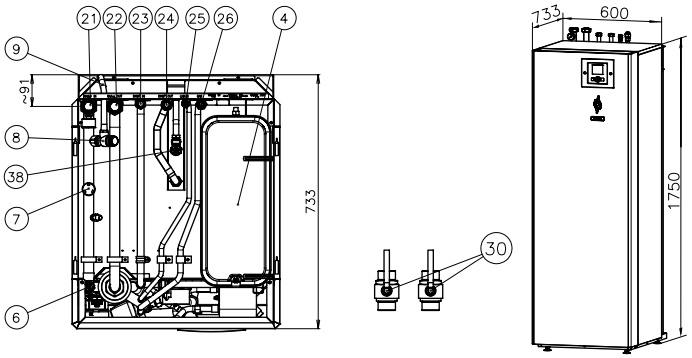
Units in: mm

Nº	Part name	Nº	Part name
1	Plate heat exchanger	21	Water inlet pipe connection 2.0-3.0HP: G 1” female / 4.0-6.0HP: G1 1/4” female
2	Water pump	22	Water outlet pipe connection 2.0-3.0HP: G 1” female / 4.0-6.0HP: G1 1/4” female
3	Electric water heater	23	DHW inlet pipe connection - G 3/4” female
4	Expansion vessel 6L	24	DHW outlet pipe connection - G 3/4” female
5	Water strainer	25	Refrigerant liquid pipe connection 2.0HP: Ø6.35 (1/4”) / 2.5~6HP: Ø9.52 (3/8”)
6	Air purger		
7	Low water pressure switch	26	Refrigerant gas pipe connection - Ø15.88 (3/8”)
8	Safety valve	27	Drain port (For indoor unit water) - G 3/8”
9	Drain pipe for safety valve	28	Drain port (For DHW) - G 3/8”
10	Refrigerant strainer (x2)	29	Manual air purger
11	Expansion valve	30	Shutdown valve (Factory supplied accessory)
12	3-way valve (for space heating and DHW)	31	Tank insulation
13	T-branch (for space heating and DHW)	32	DHW thermistor
14	Electrical box	33	Water inlet thermistor
15	Switch for DHW emergency operation	34	Water outlet thermistor
16	Unit controller	35	Water outlet PHEX thermistor
17	Manometer	36	Refrigerant liquid pipe thermistor
18	DHW tank (200L)	37	Refrigerant gas pipe thermistor
19	DHW tank heater+thermostat	38	Pressure and Temperature relief valve
20	Mounting foot (x4)	39	DHWT Thermostat

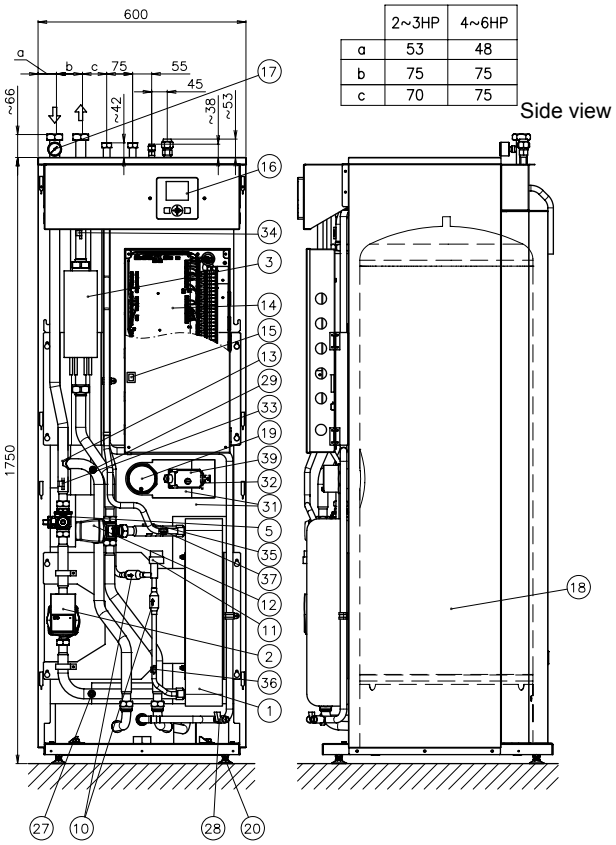


RWD-(2.0-6.0)NWSE-260S-K

Top view



Front view



	2~3HP	4~6HP
a	53	48
b	75	75
c	70	75

Side view

XEKS1756

Units in: mm

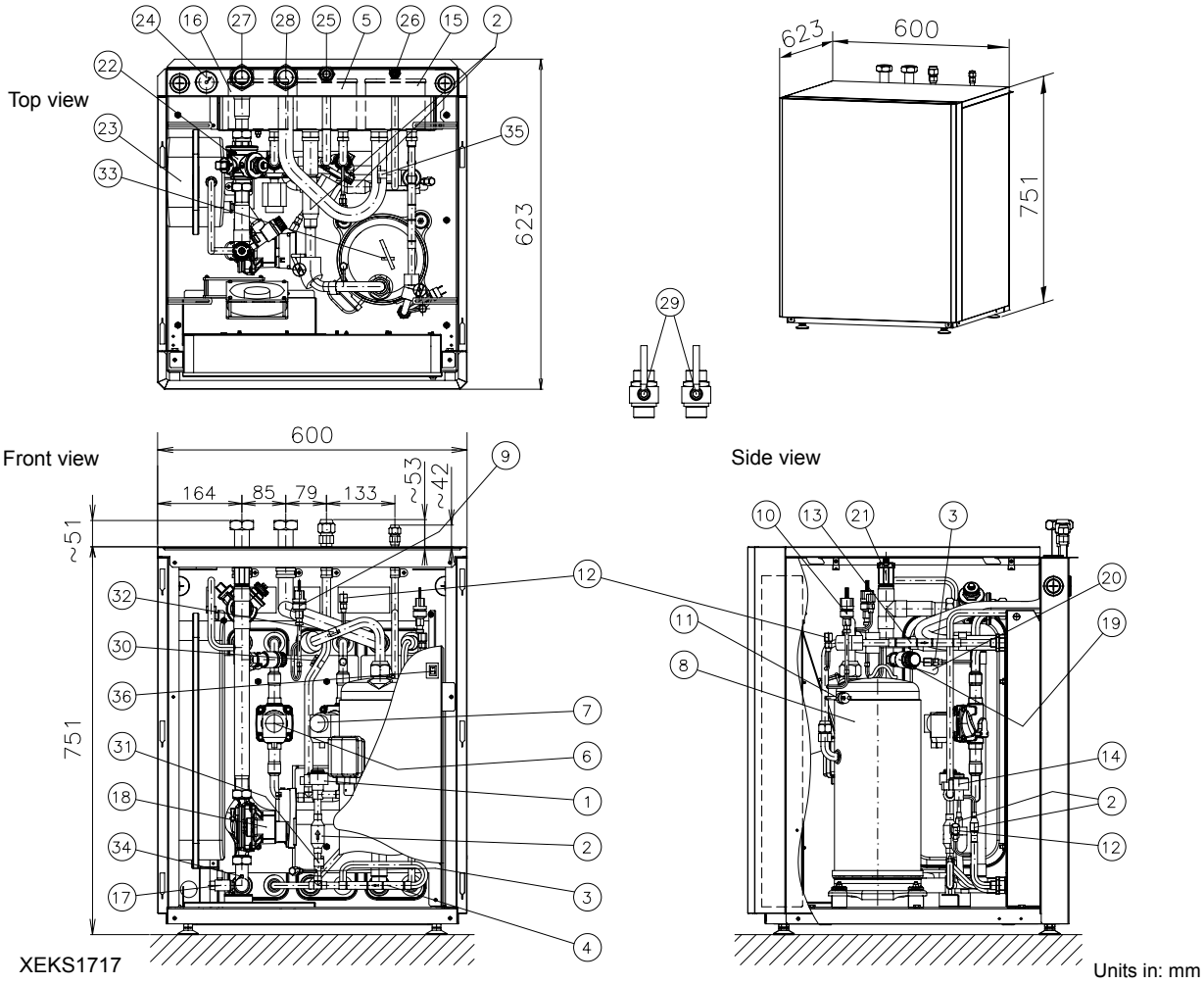
Nº	Part name	Nº	Part name
1	Plate heat exchanger	21	Water inlet pipe connection 2.0-3.0HP: G 1” female / 4.0-6.0HP: G1 1/4” female
2	Water pump	22	Water outlet pipe connection 2.0-3.0HP: G 1” female / 4.0-6.0HP: G1 1/4” female
3	Electric water heater	23	DHW inlet pipe connection - G 3/4” female
4	Expansion vessel 6L	24	DHW outlet pipe connection - G 3/4” female
5	Water strainer	25	Refrigerant liquid pipe connection 2HP: Ø6.35 (1/4”)/2.5~6HP: Ø9.52 (3/8”)
6	Air purger		
7	Low water pressure switch	26	Refrigerant gas pipe connection - Ø15.88 (5/8”)
8	Safety valve	27	Drain port (For indoor unit water) - G 3/8”
9	Drain pipe for safety valve	28	Drain port (For DHW) - G 3/8”
10	Refrigerant strainer	29	Manual air purger
11	Expansion valve	30	Shutdown valve (Factory supplied accessory)
12	3-way valve (for space heating and DHW)	31	Tank insulation
13	T-branch (for space heating and DHW)	32	DHW thermistor
14	Electrical box	33	Water inlet thermistor
15	Switch for DHW emergency operation	34	Water outlet thermistor
16	Unit controller (Except (-W) models)	35	Water outlet PHEX thermistor
17	Manometer	36	Refrigerant liquid pipe thermistor
18	DHW tank (260L)	37	Refrigerant gas pipe thermistor
19	DHW tank heater+thermostat	38	Pressure and Temperature relief valve
20	Mounting foot (x4)	39	DHWT Thermostat



7.1.2.3 YUTAKI S80

◆ TYPE 1: Version for operation in DHW but with a remote tank

RWH-(4.0-6.0)(V)NFE

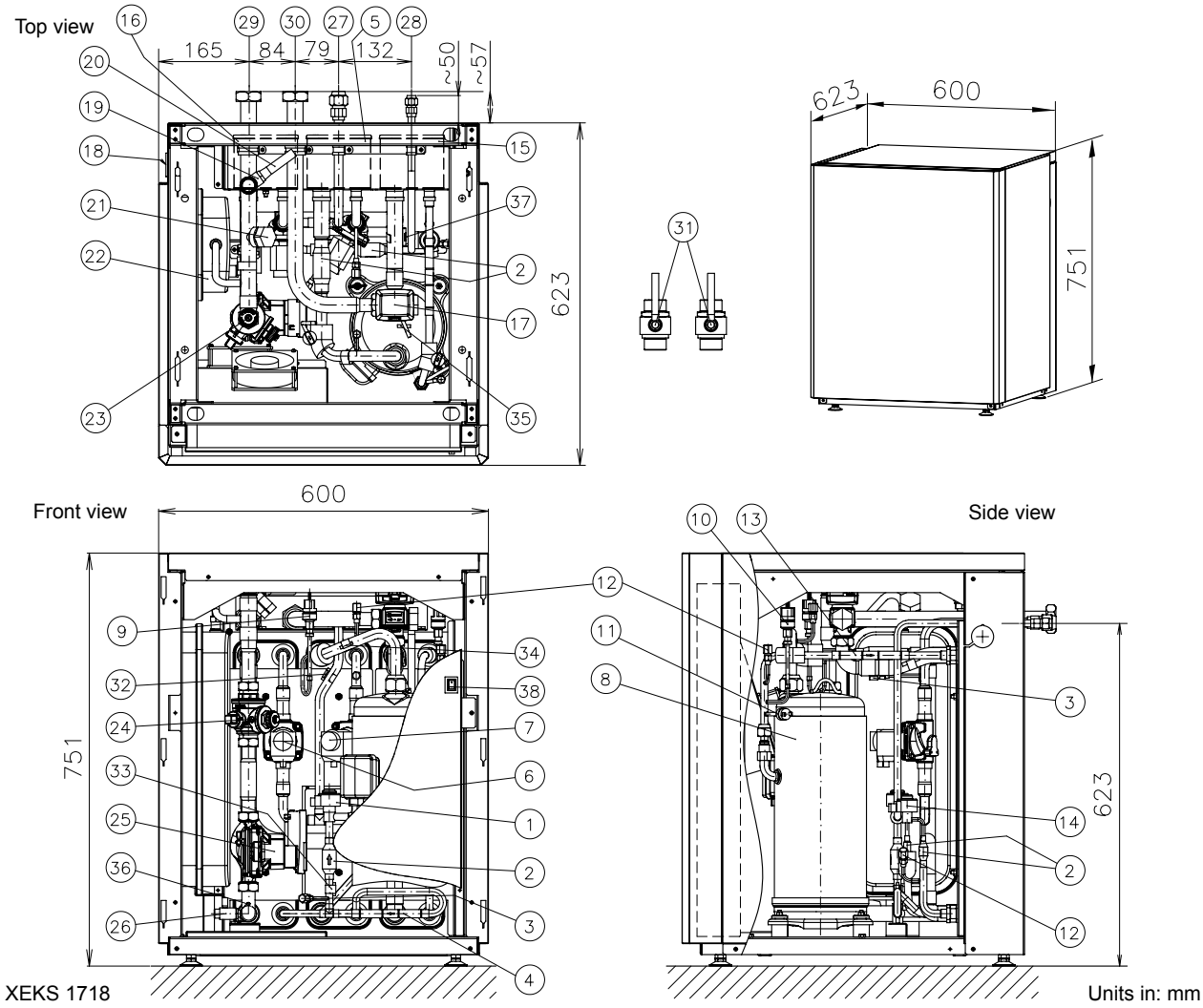


Nº	Part name	Nº	Part name
1	Electronic expansion valve (R410A)	19	Safety valve
2	Refrigerant strainer (x2)	20	Drain pipe
3	Check joint (R410A)	21	Air purger
4	Check valve (R410A)	22	Water strainer
5	Plate heat exchanger (R410A-R134a)	23	Expansion vessel 12L
6	Solenoid valve (1 cycle)	24	Manometer
7	Solenoid valve (2 cycles)	25	Refrigerant gas pipe - Ø15.88 (5/8”)
8	Compressor	26	Refrigerant liquid pipe - Ø9.52 (3/8”)
9	Low pressure sensor (Ps)	27	Water inlet pipe - G 1 1/4” female
10	High pressure sensor (Pd)	28	Water outlet pipe - G 1 1/4” female
11	High pressure switch (PSH)	29	Shut-off valve (Factory supplied)
12	Check joint (R134a)	30	Refrigerant gas pipe thermistor
13	Check valve (R134a)	31	Refrigerant liquid pipe thermistor
14	Electronic expansion valve (R134a)	32	Compressor suction thermistor
15	Plate heat exchanger (R134a-H2O)	33	Compressor discharge thermistor
16	Plate heat exchanger (R410A-H2O)	34	Water inlet thermistor
17	Water pressure port	35	Water outlet thermistor
18	Water pump	36	Switch for DHW “emergency” operation



◆ TYPE 2: Version for operation with HITACHI DHW tank

RWH-(4.0-6.0)(V)NFWE

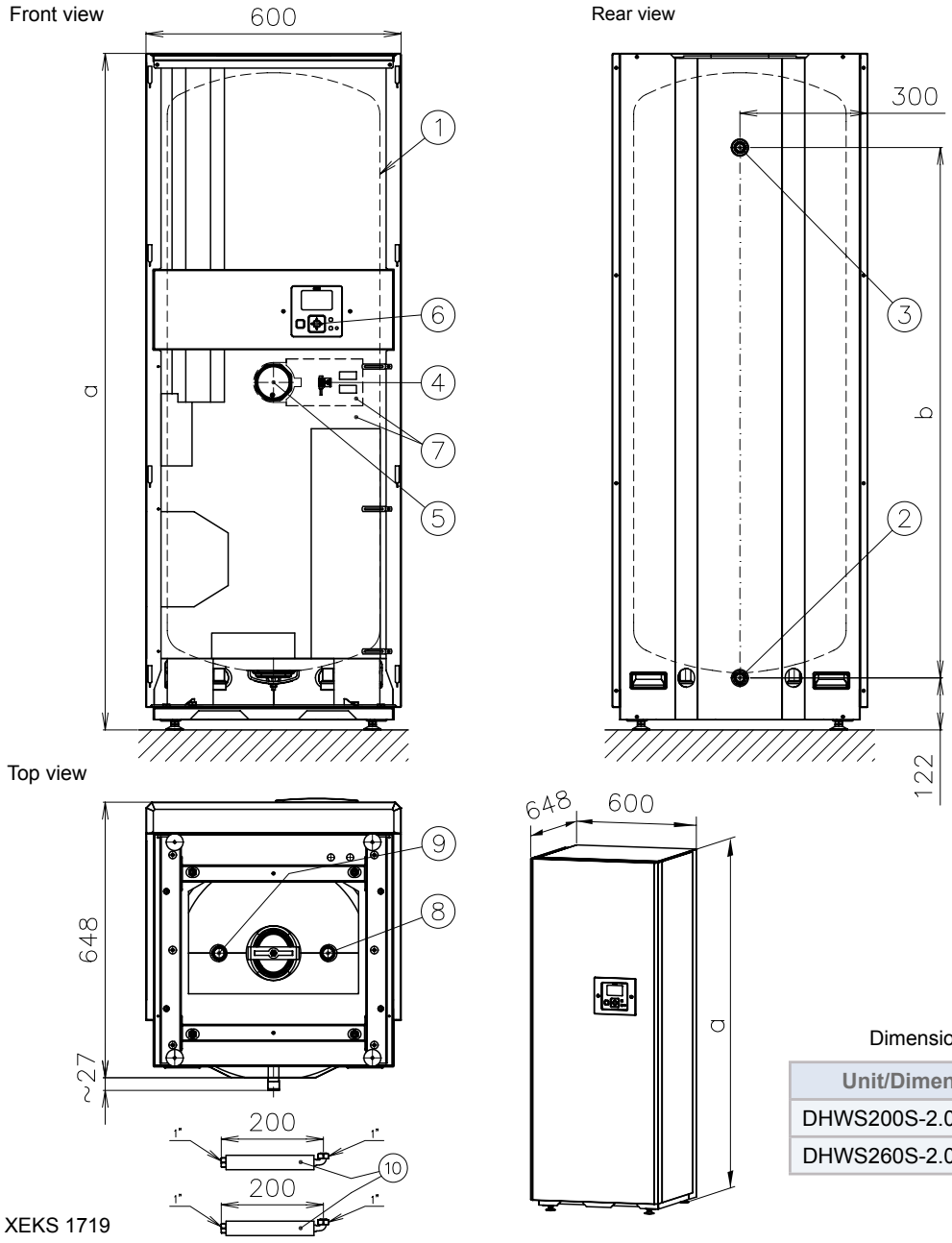


Nº	Part name	Nº	Part name
1	Electronic expansion valve (R410A)	20	Drain pipe
2	Refrigerant strainer (x2)	21	Connection for DHW tank outlet
3	Check joint (R410A)	22	Expansion vessel 12L
4	Check valve (R410A)	23	Air purger
5	Plate heat exchanger (R410A-R134a)	24	Water strainer
6	Solenoid valve (1 cycle)	25	Water pump
7	Solenoid valve (2 cycles)	26	Drain port
8	Compressor	27	Refrigerant gas pipe - Ø15.88 (5/8”)
9	Low pressure sensor (Ps)	28	Refrigerant liquid pipe - Ø9.52 (3/8”)
10	High pressure sensor (Pd)	29	Water inlet pipe - G 1 1/4” female
11	High pressure switch (PSH)	30	Water outlet pipe - G 1 1/4” female
12	Check joint (R134a)	31	Shut-off valve (Factory supplied)
13	Check valve (R134a)	32	Refrigerant gas pipe thermistor
14	Electronic expansion valve (R134a)	33	Refrigerant liquid pipe thermistor
15	Plate heat exchanger (R134a-H2O)	34	Compressor suction thermistor
16	Plate heat exchanger (R410A-H2O)	35	Compressor discharge thermistor
17	3 way valve	36	Water inlet thermistor
18	Manometer	37	Water outlet thermistor
19	Safety valve	38	Switch for DHW “emergency” operation



◆ Domestic hot water tank

DHWS(200/260)S-2.0H2E(-W)



Dimensions according the unit

Unit/Dimension	a	b
DHWS200S-2.0H2E(-W)	1282	938.5
DHWS260S-2.0H2E(-W)	1591	1247.5

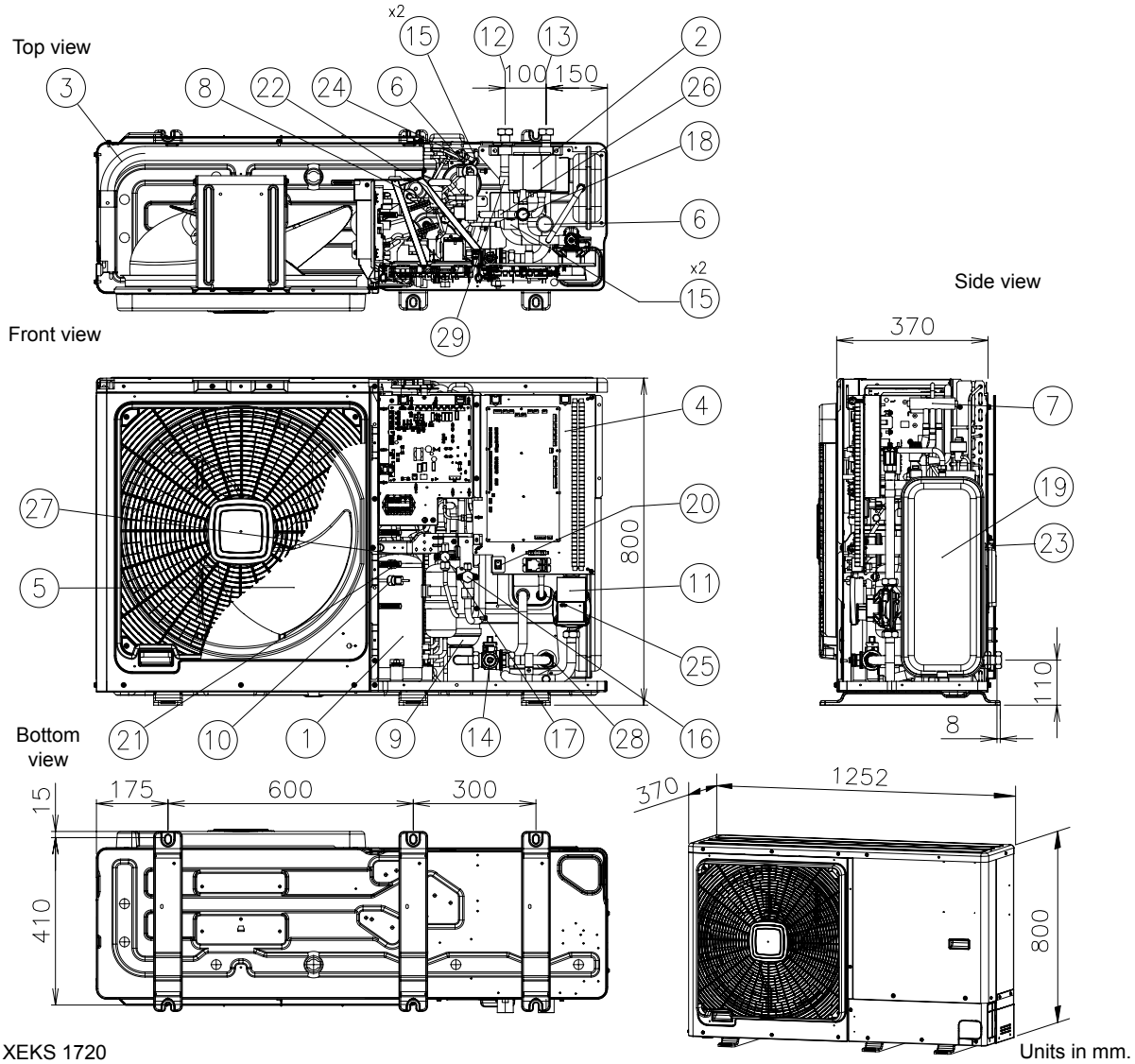
Units in mm.

Nº	Part name
1	Domestic hot water tank
2	DHW inlet G 3/4” male
3	DHW outlet G 3/4” male
4	DHW tank thermistor
5	Heater+ thermostat
6	Unit controller (Except (-W) models)
7	Tank insulation
8	Heating coil inlet connection G 1” male
9	Heating coil outlet connection G 1” male
10	Flexible pipe (x2)



7.1.3 Monobloc system - YUTAKI M

RASM-3VNE



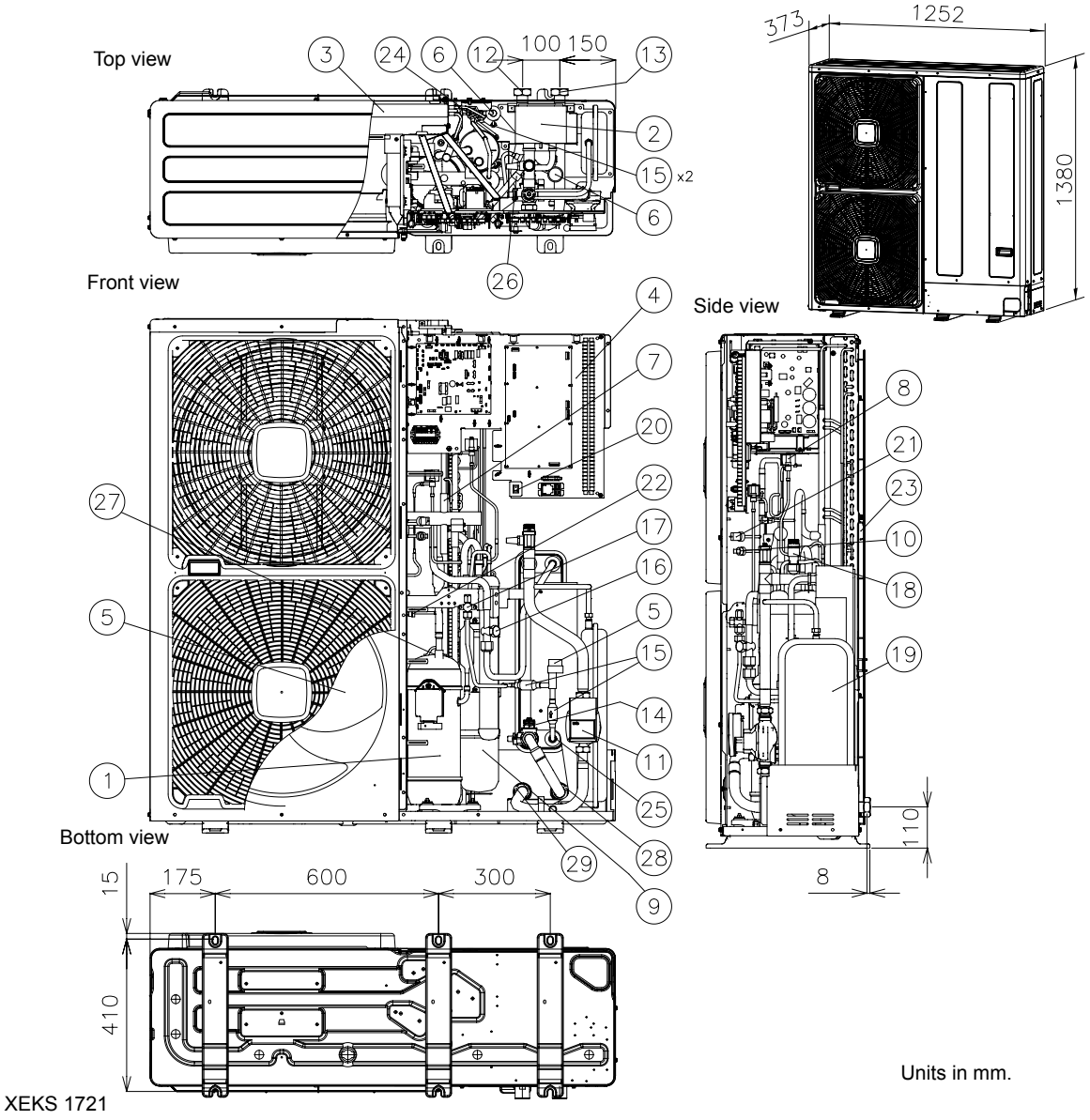
XEKS 1720

Units in mm.

Nº	Part name	Nº	Part name
1	Compressor	15	Refrigerant strainer (x4)
2	Water side heat exchanger	16	Stop valve for gas line - Ø15.88 (5/8”)
3	Air side heat exchanger	17	Stop valve for liquid line - Ø9.52 (3/8”)
4	Electrical box	18	Safety valve
5	Fan (x1)	19	Expansion vessel 6L
6	Expansion valve (x2)	20	Switch for DHW “emergency” operation
7	Reversing valve	21	Sensor for refrigerant pressure
8	Solenoid valve	22	Pressure switch for control (Pd)
9	Accumulator	23	Ambient thermistor
10	High pressure switch (PSH)	24	Evaporating temperature thermistor
11	Water pump	25	Refrigerant liquid pipe thermistor
12	Water outlet - G 1”	26	Refrigerant gas pipe thermistor
13	Water inlet - G 1”	27	Compressor discharge thermistor
14	Water strainer	28	Water inlet thermistor
		29	Water outlet thermistor



RASM-(4-6)(V)NE



XEKS 1721

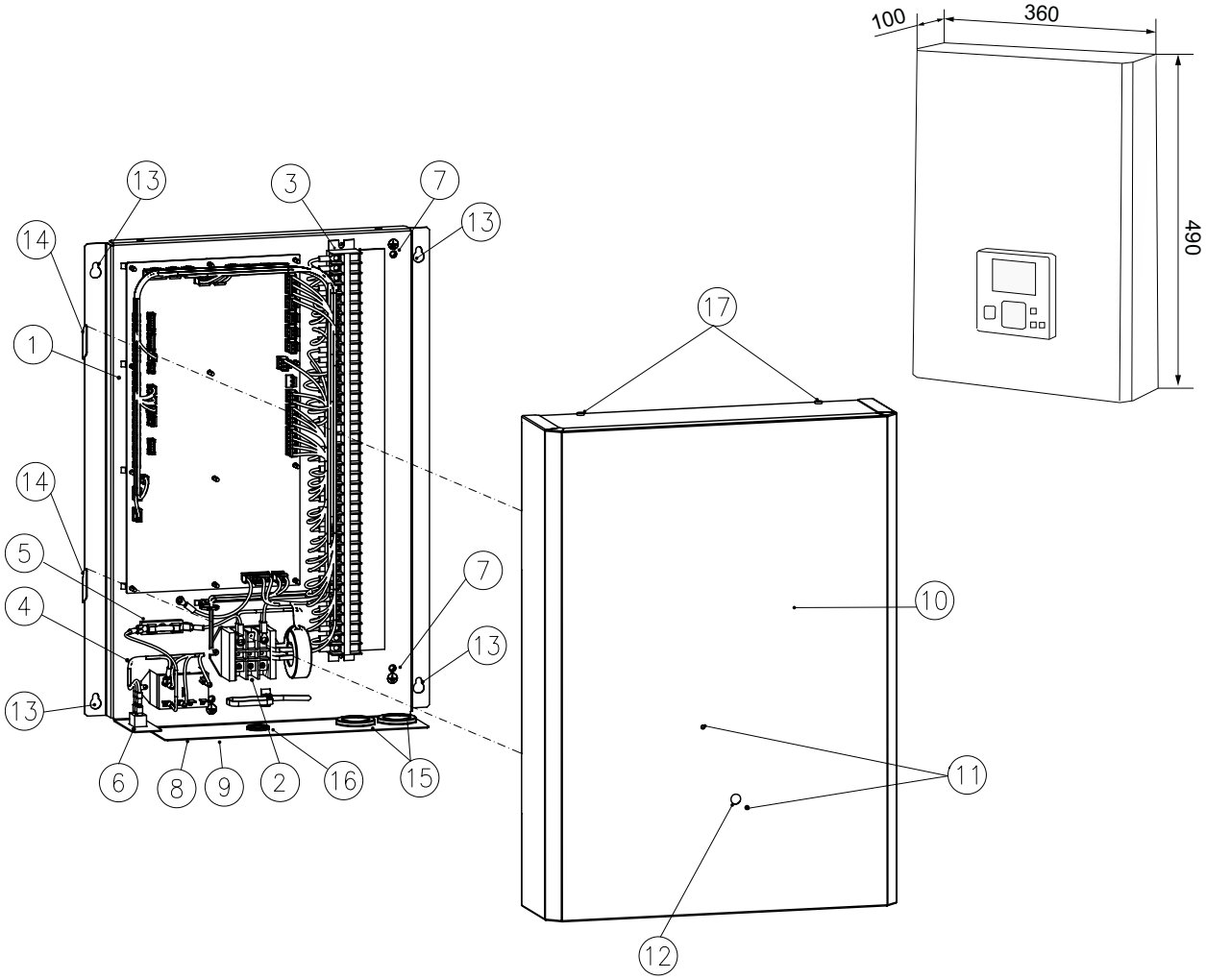
Units in mm.

Nº	Part name	Nº	Part name
1	Compressor	15	Refrigerant strainer (x4)
2	Water side heat exchanger	16	Stop valve for gas line - ∅25.4 (1”)
3	Air side heat exchanger	17	Stop valve for liquid line - ∅9.52 (3/8”)
4	Electrical box	18	Safety valve
5	Fan (x2)	19	Expansion vessel 6L
6	Expansion valve (x2)	20	Switch for DHW “emergency” operation
7	Reversing valve	21	Sensor for refrigerant pressure
8	Solenoid valve	22	Pressure switch for control (Pd)
9	Accumulator	23	Ambient thermistor
10	High pressure switch (PSH)	24	Evaporating temperature thermistor
11	Water pump	25	Refrigerant liquid pipe thermistor
12	Water outlet - G 1 1/4”	26	Refrigerant gas pipe thermistor
13	Water inlet - G 1 1/4”	27	Compressor discharge thermistor
14	Water strainer	28	Water inlet thermistor
		29	Water outlet thermistor



7.1.4 Complementary system

7.1.4.1 YUTAKI CASCADE CONTROLLER



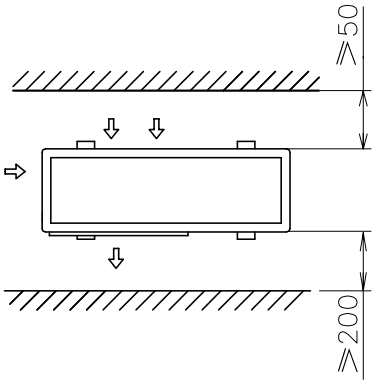
Nº	Part name
1	Electrical Box
2	Terminal Board (TB1)
3	Terminal Board (TB2)
4	Relay (AR1)
5	Fuse (EF1) and Fuse holder
6	Switch for DHW emergency operation
7	Earth screw
8	Model Label (Bottom)
9	Electrical data label (Bottom)
10	Service cover
11	LCD unit controller assembly holes (x2)
12	LCD unit controller routing hole
13	Wall mounting holes (x4)
14	Service cover assembly hooks (x2)
15	Rubber bushing for control wiring (x2)
16	Rubber bushing for power supply wiring
17	Service cover fixation screws (x2)

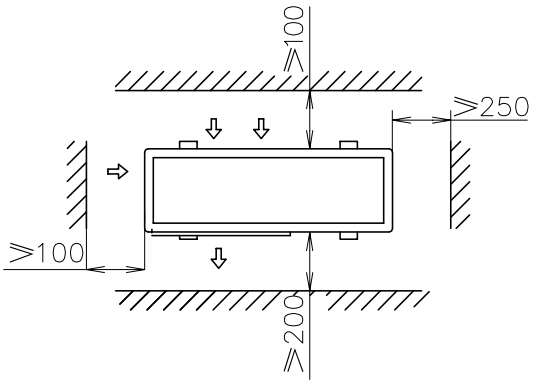


7.2 Service space

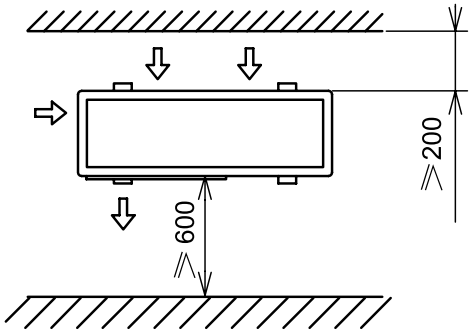
7.2.1 Split system - Outdoor unit

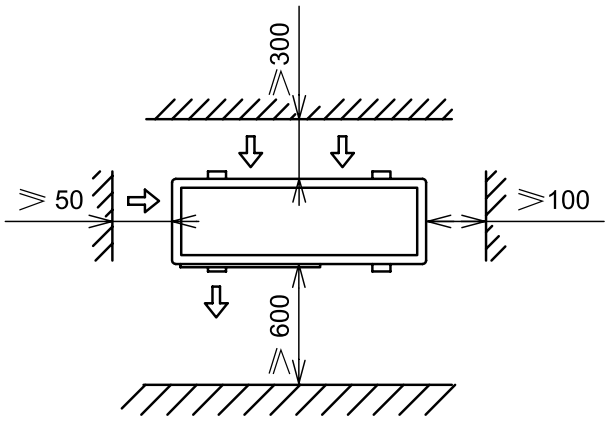
RAS-(2-3)WHVNP





RAS-(4-6)WH(V)NPE/ RAS-(8/10)WHNPE





Units in mm.

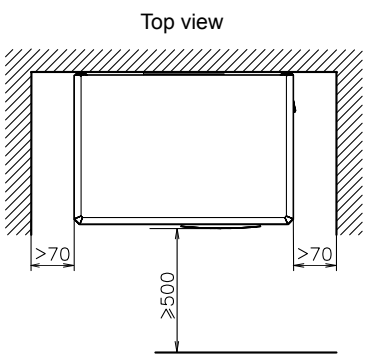
NOTE

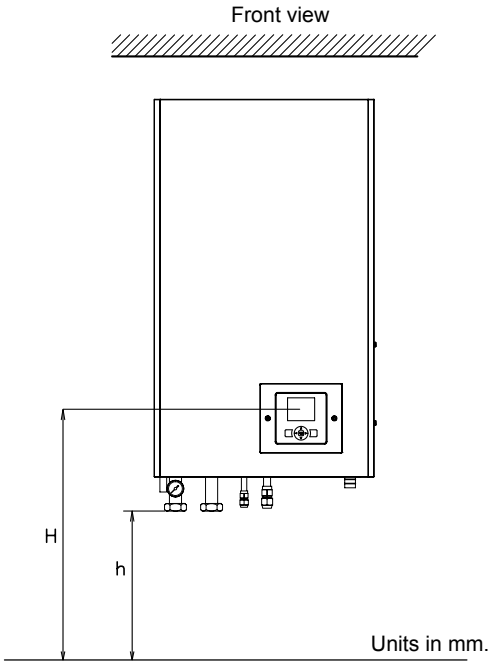
Please refer to the Service Manual for detailed information.

7.2.2 Split system - Indoor unit

7.2.2.1 YUTAKI S

RWM-(2.0-10.0)NE(-W)





H: 1200~1500 mm

Recommended unit height for proper access to the control unit panel (Unit controller).

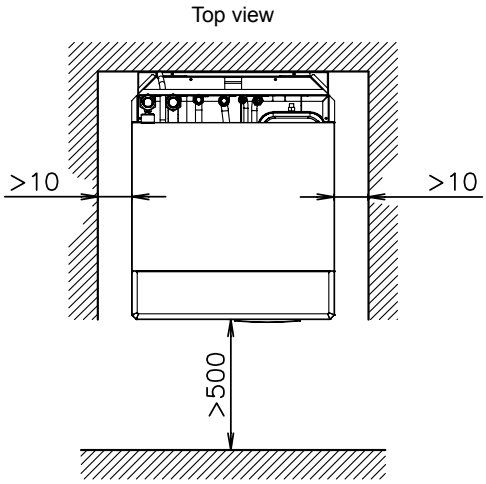
h: 350 mm

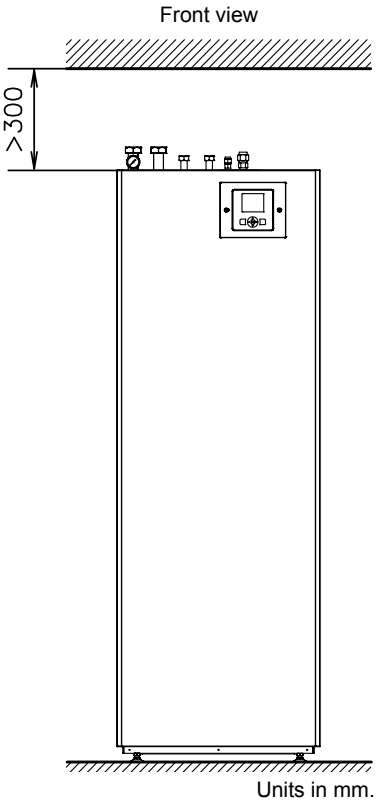
Minimum unit height for installing the shut-off valves and the first bending pipe line.

7.2.2.2 YUTAKI S COMBI

◆ **Standard model and UK market**

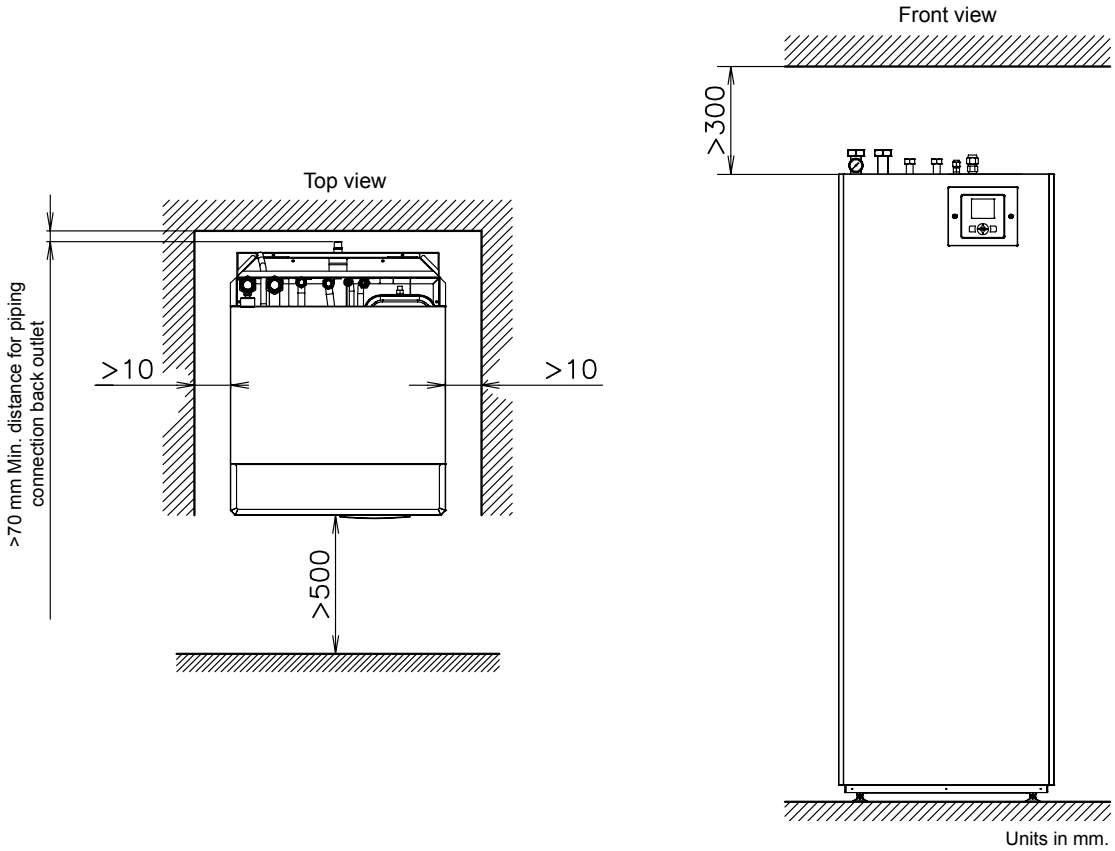
RWD-(2.0-6.0)NWE-(200/260)S(-K)(-W)





◆ Model for solar combination

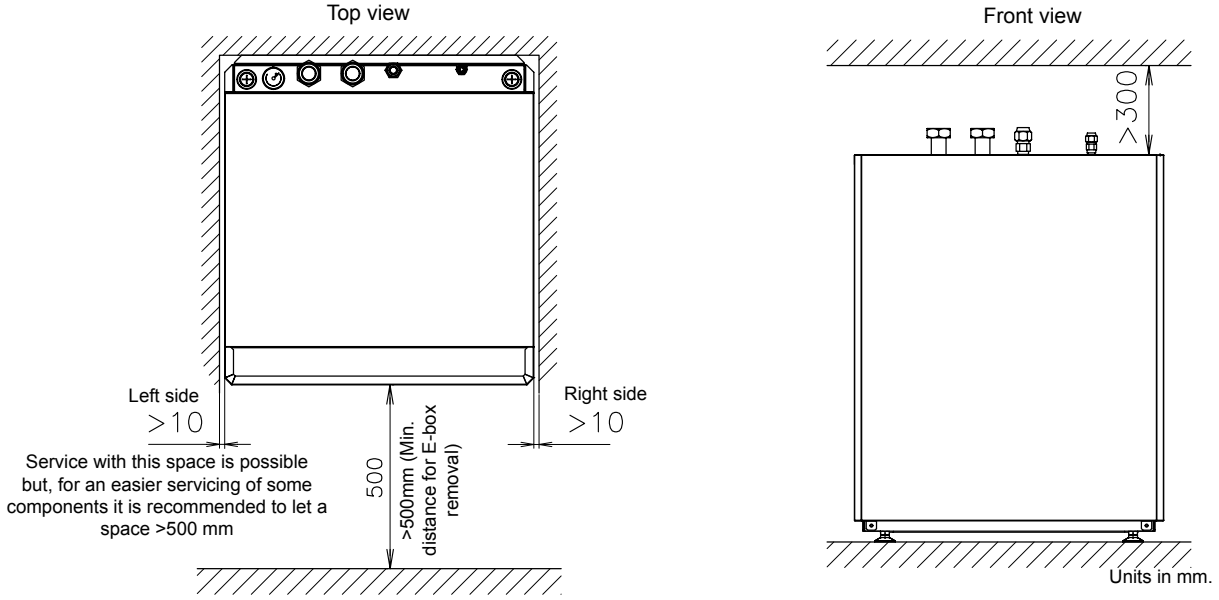
RWD-(2.0-6.0)NWSE-260S(-W)



7.2.2.3 YUTAKI S80

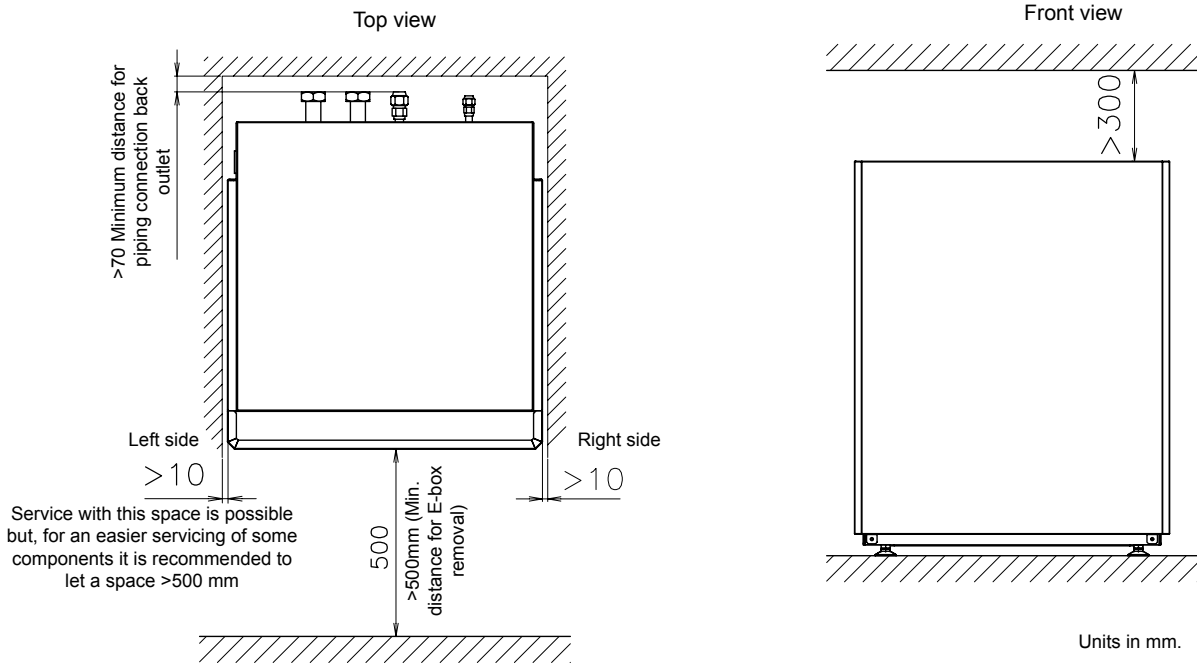
Type 1: Indoor unit alone

RWH-(4.0-6.0)(V)NFE



◆ Type 1: Indoor unit for operation with remote domestic hot water tank

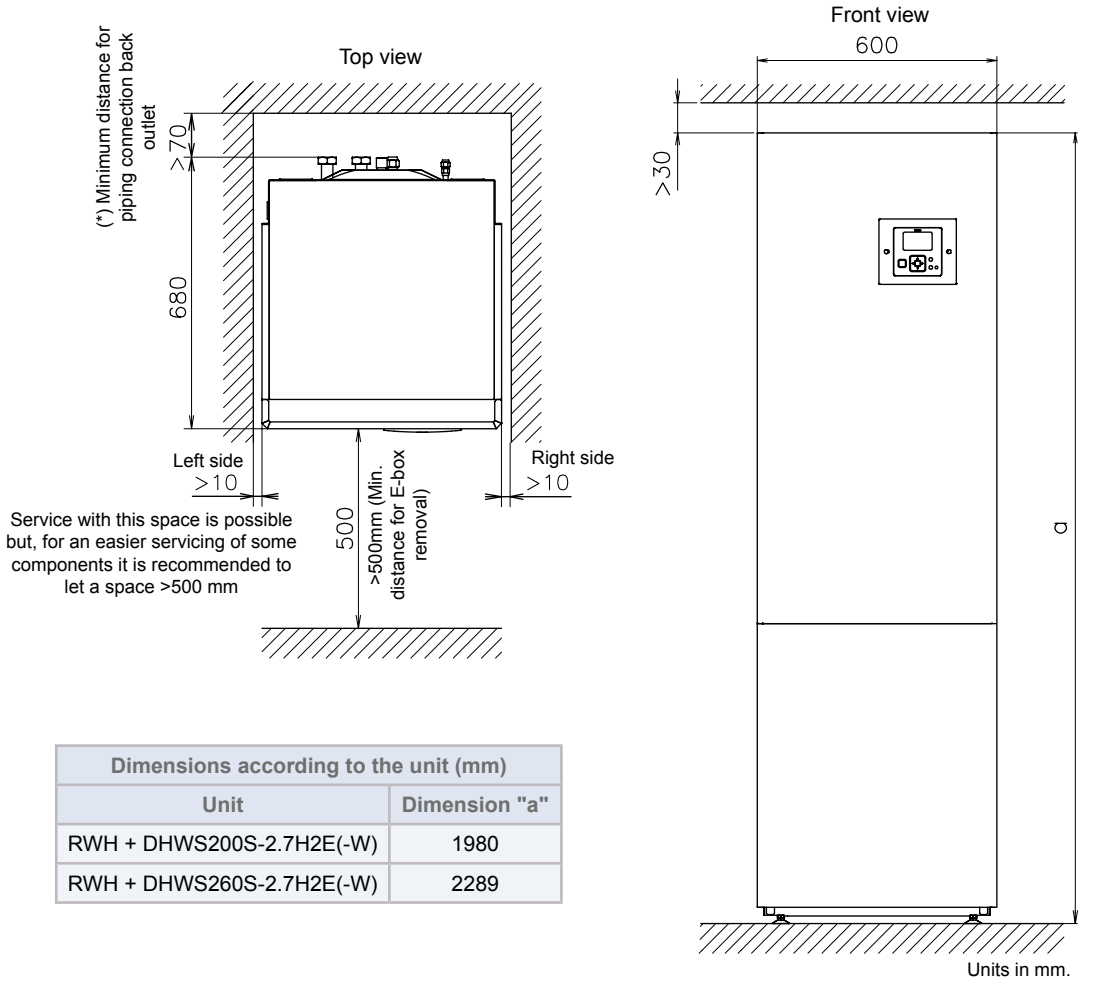
RWH-(4.0-6.0)(V)NFWE



Units in mm.

◆ Type 2: Indoor unit + Domestic hot water tank on top of the unit

RWH-(4.0-6.0)(V)NFWE + DHWS(200/260)S-2.7H2E(-W)

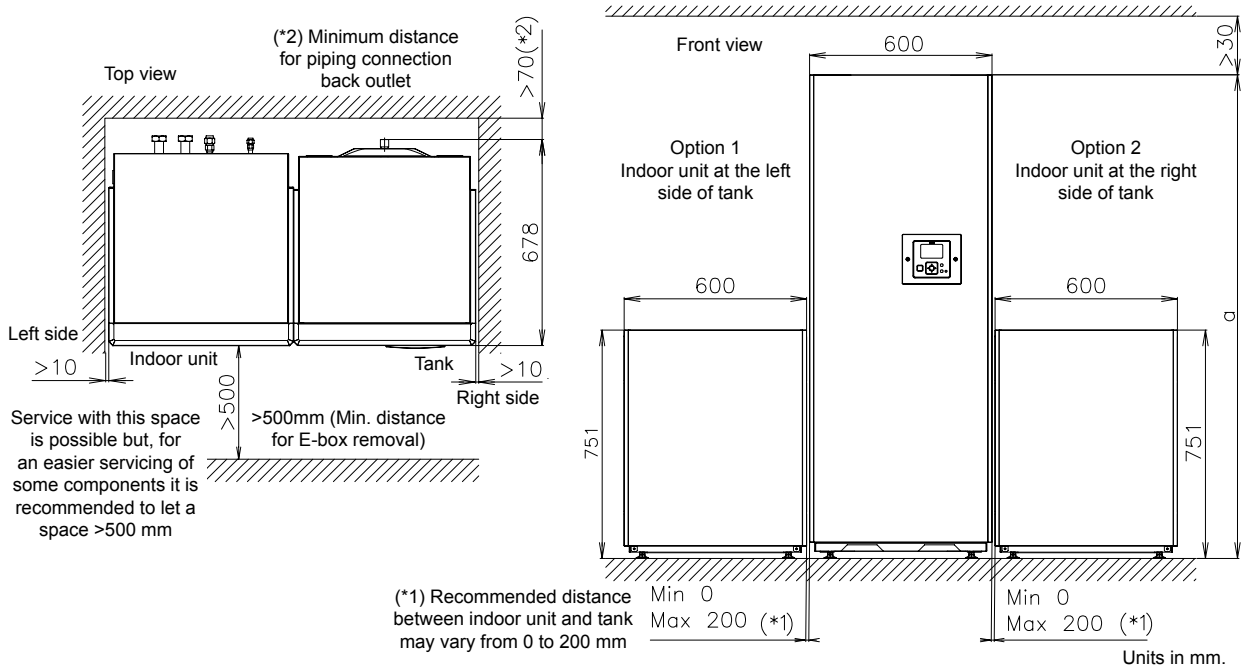


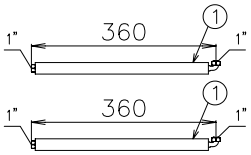
Dimensions according to the unit (mm)	
Unit	Dimension "a"
RWH + DHWS200S-2.7H2E(-W)	1980
RWH + DHWS260S-2.7H2E(-W)	2289

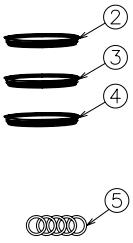
Units in mm.

◆ Type 2: Indoor unit + Domestic hot water tank beside the indoor unit

RWH-(4.0-6.0)(V)NFWE + DHWS(200/260)S-2.7H2E(-W)





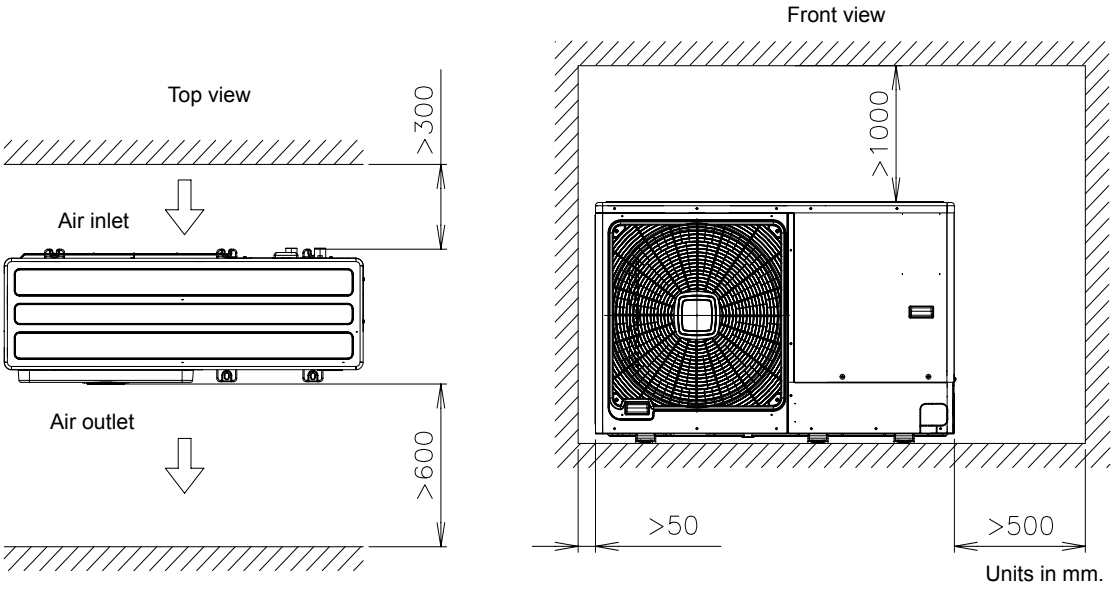


Dimensions according to the unit (mm)	
Unit	Dimension "a"
RWH + DHWS200S-2.7H2E(-W)	1980
RWH + DHWS260S-2.7H2E(-W)	2289

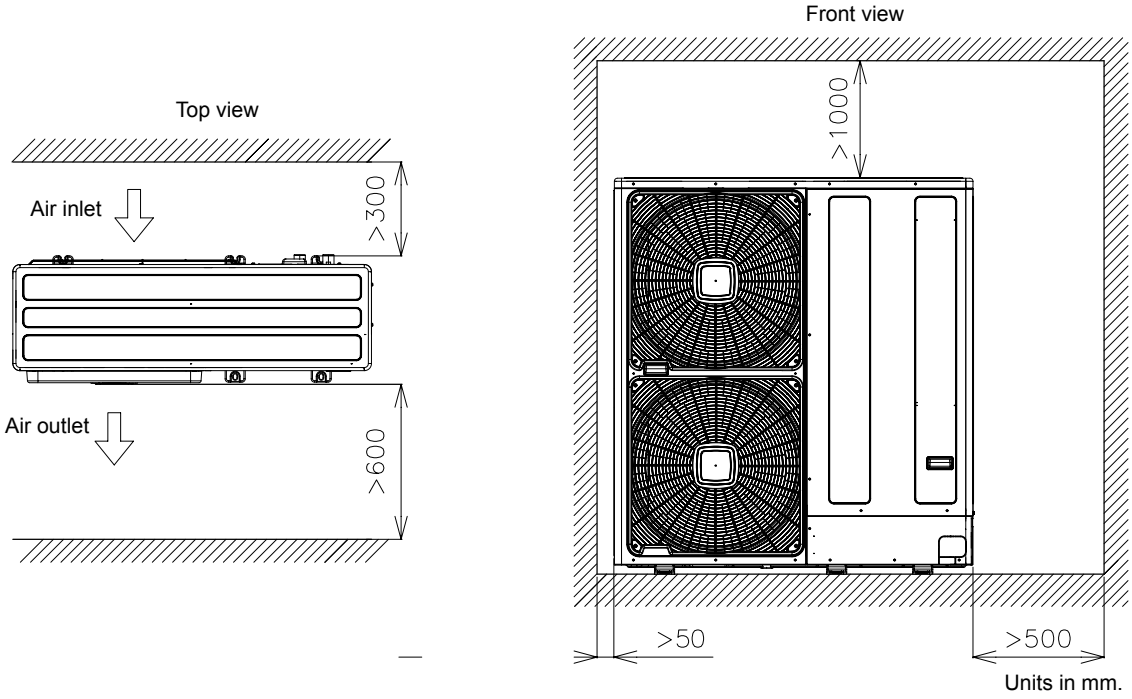
Mark	Part name	Remarks
1	Flexible water pipe (x4)	For heating coil inlet and outlet connections of indoor unit and DHW tank
2	Extension cables	For tank electric heater
3	Extension cables	For tank thermistor
4	Extension cables	For unit controller
5	Gasket (x5)	Gaskets (x5) for each flexible water pipe end (+1 for spare)

7.2.3 Monobloc system - YUTAKI M

RASM-3VNE

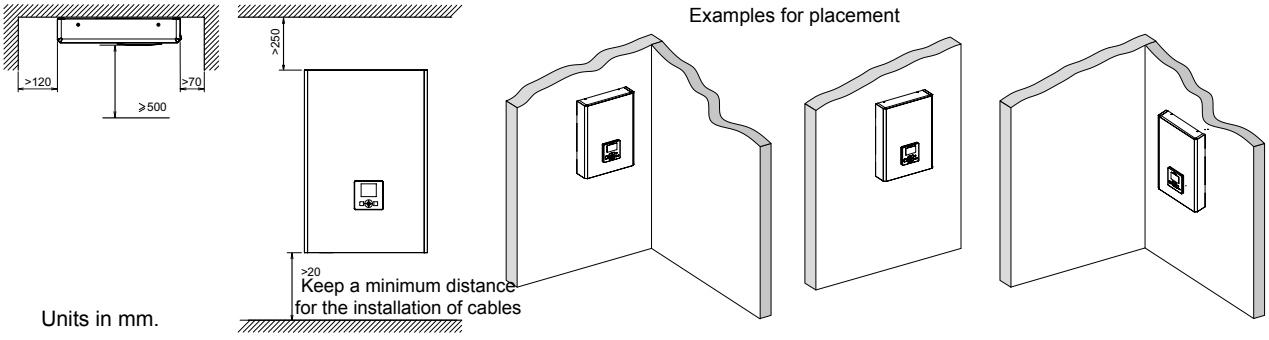


RASM-(4-6)(V)NE



7.2.4 Complementary system

7.2.4.1 YUTAKI CASCADE CONTROLLER



8. Refrigerant cycle and hydraulic circuit

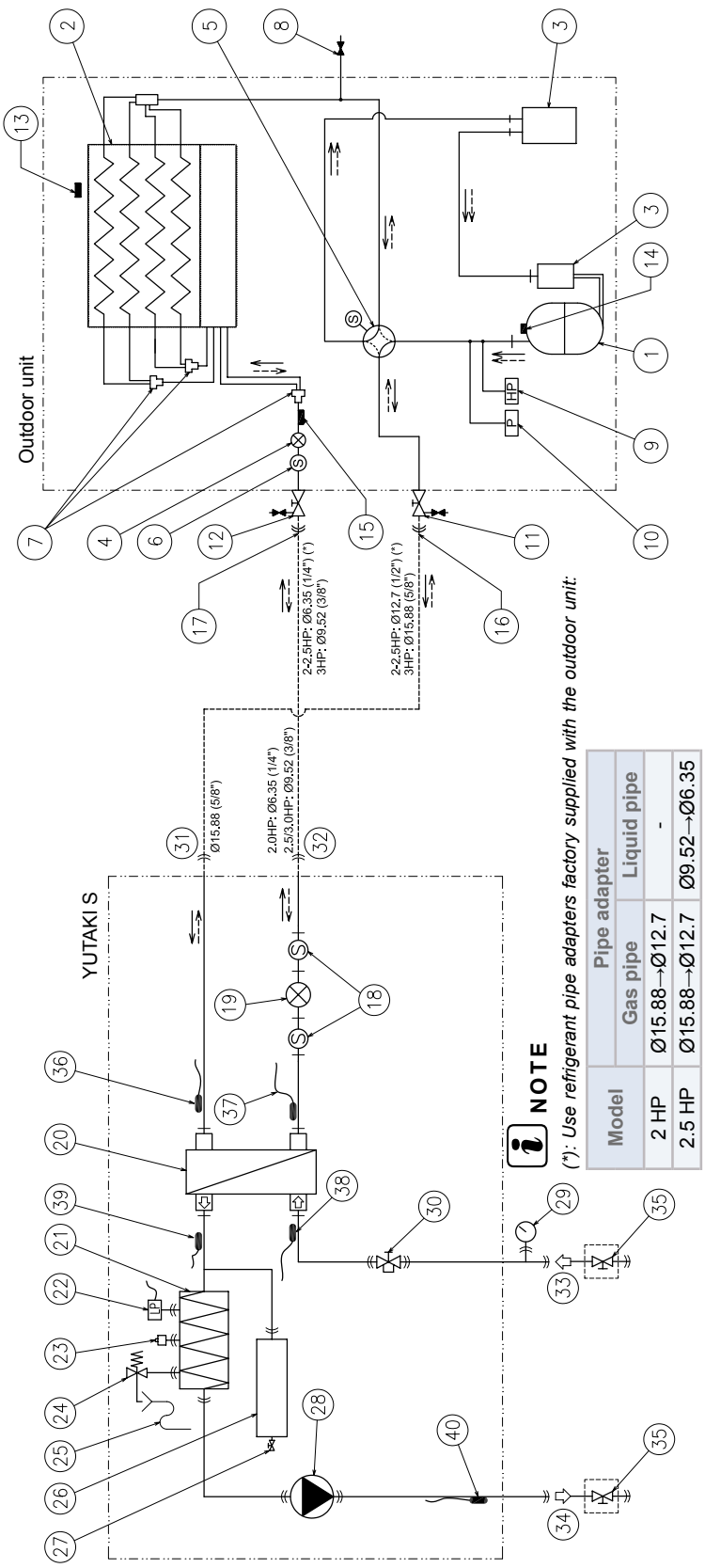
Index

8.1 Refrigerant cycle and hydraulic circuit for Split system 208
8.1.1 YUTAKI S 208
8.1.2 YUTAKI S COMBI 211
8.1.3 YUTAKI S80 213
8.1.3.1 Indoor unit standalone version 213
8.1.3.2 Indoor unit for integrated tank version 214
8.2 Refrigerant cycle and hydraulic circuit for Monobloc system - YUTAKI M 215

8.1 Refrigerant cycle and hydraulic circuit for Split system

8.1.1 YUTAKI S

◆ **RAS-(2-3)WHVNP + RWM-(2.0-3.0)NE(-W)**



Model	Pipe adapter	
	Gas pipe	Liquid pipe
2 HP	Ø15.88→Ø12.7	-
2.5 HP	Ø15.88→Ø12.7	Ø9.52→Ø6.35

NOTE

(*): Use refrigerant pipe adapters factory supplied with the outdoor unit:

Heating refrigerant flow	Cooling refrigerant flow	Water flow (Heating/Cooling)	Field supplied piping line	Flare nut connection	Brazed connection	Refrigerant	R410A

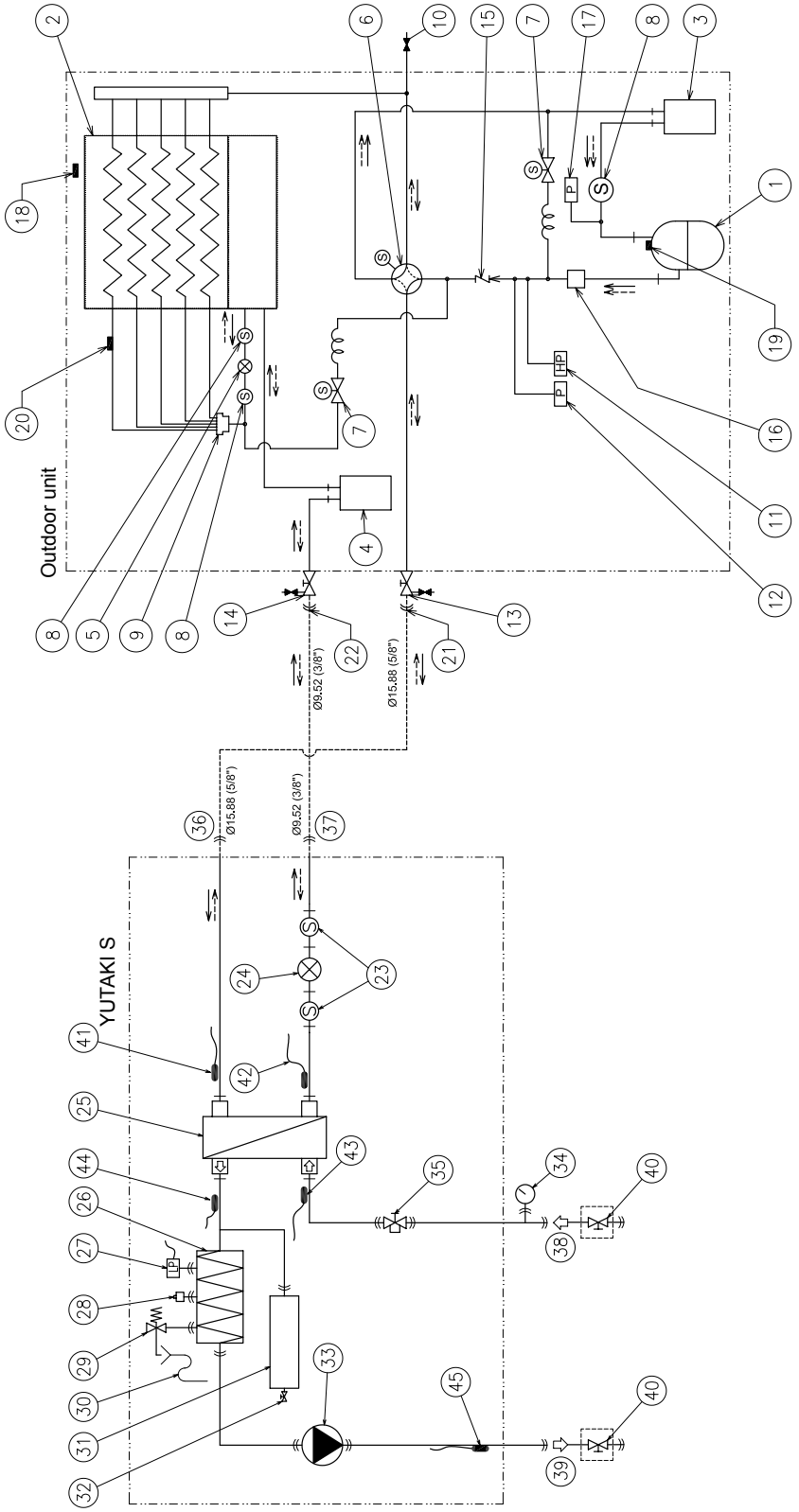
N°	Part name
1	Compressor
2	Air side heat exchanger
3	Accumulator
4	OU electronic expansion valve
5	4-way valve
6	OU refrigerant strainer
7	Distributor
8	Refrigerant check joint
9	High pressure switch for protection
10	Pressure switch for control

N°	Part name
11	Stop valve for gas line
12	Stop valve for liquid line
13	Ambient thermistor
14	Discharge gas thermistor
15	Pipe thermistor
16	OU refrigerant gas connection
17	OU refrigerant liquid connection
18	IU refrigerant strainer
19	IU electronic expansion valve
20	Water side heat exchanger

N°	Part name
21	Water electric heater
22	Low pressure switch
23	Air purger
24	Safety valve
25	Drain pipe
26	Expansion vessel
27	Air valve for pressure regulation of expansion vessel
28	Water pump
29	Manometer
30	Water strainer

N°	Part name
31	IU refrigerant gas connection
32	IU refrigerant liquid connection
33	Water inlet connection
34	Water outlet connection
35	Shut-off valve (Accessory)
36	Gas pipe thermistor (Heating)
37	Liquid pipe thermistor (Heating)
38	Water inlet thermistor
39	PHEX water outlet thermistor
40	Water outlet thermistor

◆ RAS-(4-6)WH(V)NPE + RWM-(4.0-6.0)NE(-W)



Heating refrigerant flow	
Cooling refrigerant flow	
Water flow (Heating/Cooling)	
Field supplied piping line	
Flare nut connection	
Brazed connection	
Refrigerant	R410A

N°	Part name
1	Compressor
2	Air side heat exchanger
3	Accumulator
4	Receiver
5	OU electronic expansion valve
6	4-way valve
7	Solenoid gas for by-pass
8	OU refrigerant strainer
9	Distributor
10	Refrigerant check joint

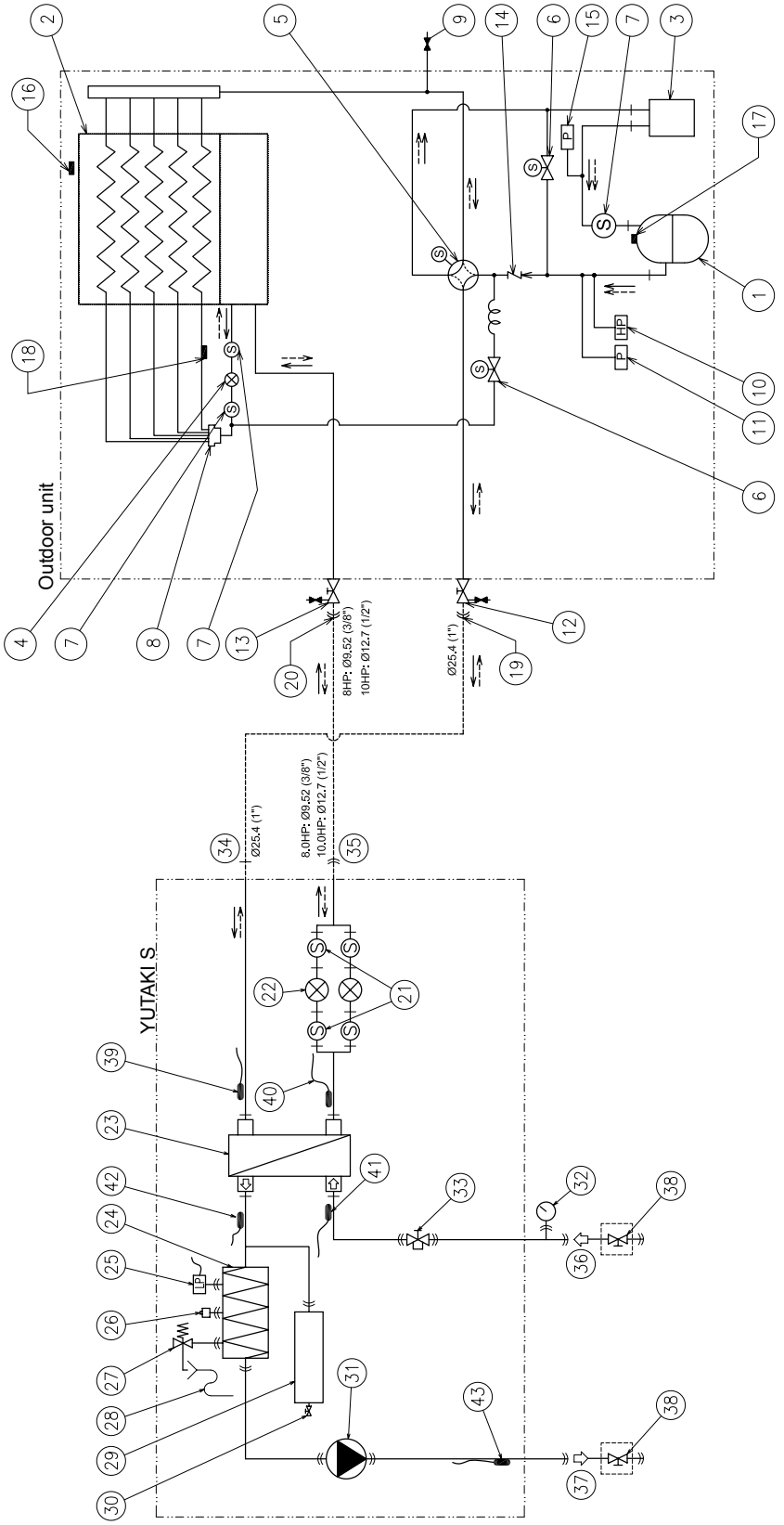
N°	Part name
11	High pressure switch for protection
12	Sensor for refrigerant pressure
13	Stop valve for gas line
14	Stop valve for liquid line
15	Check valve
16	Silencer
17	Pressure switch for control
18	Ambient thermistor
19	Discharge gas thermistor

N°	Part name
20	Pipe thermistor
21	OU refrigerant gas connection
22	OU refrigerant liquid connection
23	IU refrigerant strainer
24	IU electronic expansion valve
25	Water side heat exchanger
26	Water electric heater
27	Low pressure switch
28	Air purger
29	Safety valve

N°	Part name
30	Drain pipe
31	Expansion vessel
32	Air valve for pressure regulation of expansion vessel
33	Water pump
34	Manometer
35	Water strainer
36	IU refrigerant gas connection
37	IU refrigerant liquid connection
38	Water inlet connection

N°	Part name
39	Water outlet connection
40	Shut-off valve (Accessory)
41	Gas pipe thermistor (Heating)
42	Liquid pipe thermistor (Heating)
43	Water inlet thermistor
44	PHEX water outlet thermistor
45	Water outlet thermistor

◆ RAS-(8/10)WHNPE + RWM-(8.0-10.0)NE(-W)



Heating refrigerant flow	Cooling refrigerant flow	Water flow (Heating/Cooling)	Field supplied piping line
Flare nut connection	Brazed connection	Refrigerant	R410A

N°	Part name
1	Compressor
2	Air side heat exchanger
3	Accumulator
4	OU electronic expansion valve
5	4-way valve
6	Solenoid gas for by-pass
7	OU refrigerant strainer
8	Distributor
9	Refrigerant check joint

N°	Part name
10	High pressure switch for protection
11	Sensor for refrigerant pressure
12	Stop valve for gas line
13	Stop valve for liquid line
14	Check valve
15	Pressure switch for control
16	Ambient thermistor
17	Discharge gas thermistor
18	Pipe thermistor

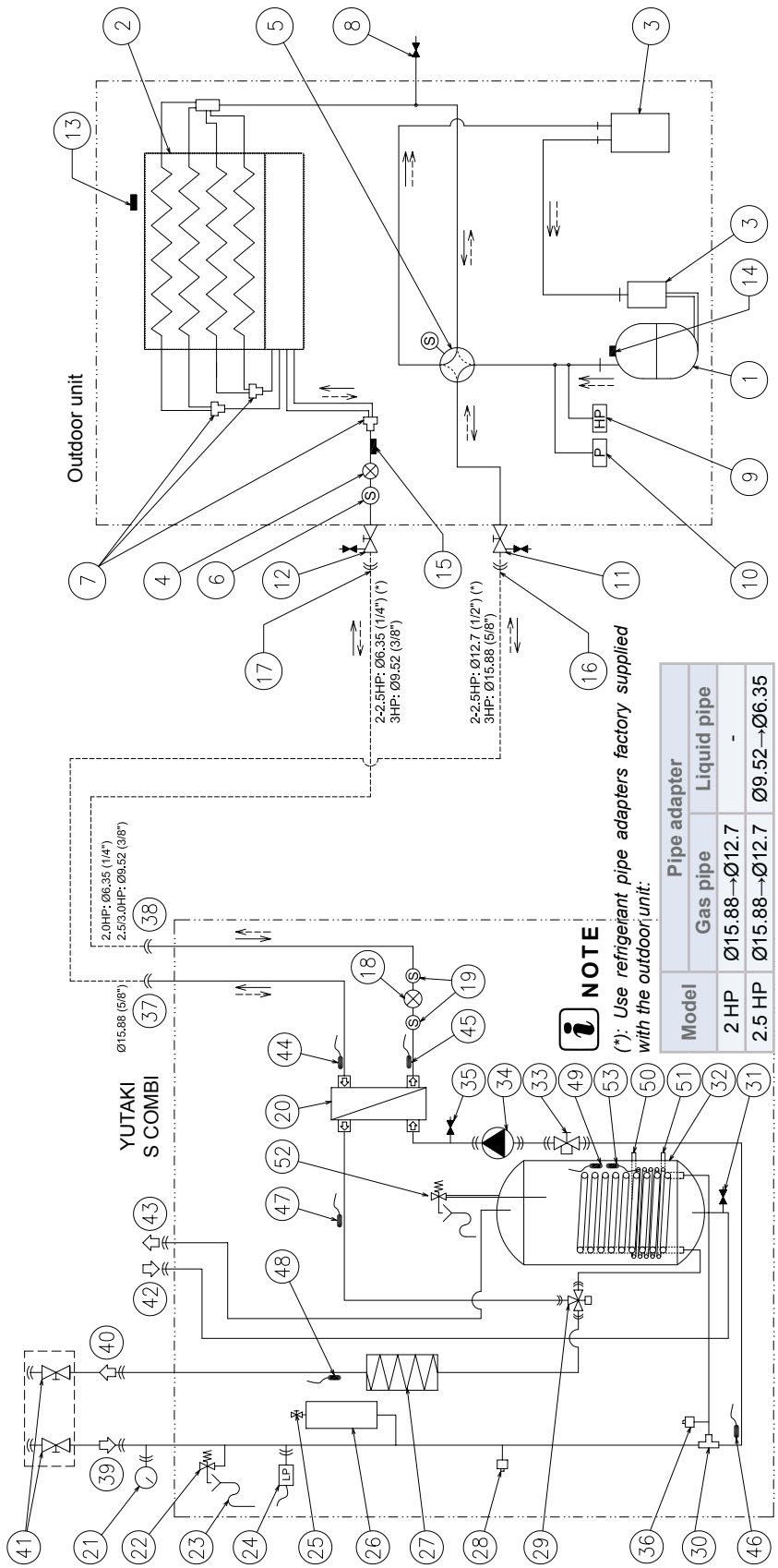
N°	Part name
19	OU refrigerant gas connection
20	OU refrigerant liquid connection
21	IU refrigerant strainer
22	IU electronic expansion valve
23	Water side heat exchanger
24	Water electric heater
25	Low pressure switch
26	Air purger
27	Safety valve

N°	Part name
28	Drain pipe
29	Expansion vessel
30	Air valve for pressure regulation of expansion vessel
31	Water pump
32	Manometer
33	Water strainer
34	IU refrigerant gas connection
35	IU refrigerant liquid connection
36	Water inlet connection

N°	Part name
37	Water outlet connection
38	Shut-off valve (Accessory)
39	Gas pipe thermistor (Heating)
40	Liquid pipe thermistor (Heating)
41	Water inlet thermistor
42	PHEX water outlet thermistor
43	Water outlet thermistor

8.1.2 YUTAKI S COMBI

◆ RAS-(2-3)WHVNP + RWD-(2.0-3.0)NW(S)E-(200/260)S(-K)



Heating refrigerant flow	Cooling refrigerant flow	Water flow (Heating/Cooling)	Field supplied piping line

Flare nut connection	Brazed connection	Refrigerant	R410A

N°	Part name	N°	Part name	N°	Part name	N°	Part name
1	Compressor	11	Stop valve for gas line	22	Safety valve	32	Domestic hot water tank
2	Air side heat exchanger	12	Stop valve for liquid line	23	Drain pipe	33	Water strainer
3	Accumulator	13	Ambient thermistor	24	Low pressure switch	34	Water pump
4	OU electronic expansion valve	14	Discharge gas thermistor	25	Air valve for pressure regulation of expansion vessel	35	Drain port (For IU water)
5	4-way valve	15	Pipe thermistor	26	Expansion vessel	36	Manual air purger
6	OU refrigerant strainer	16	OU refrigerant gas connection	27	Water electric heater	37	IU refrigerant gas connection
7	Distributor	17	OU refrigerant liquid connection	28	Air purger	38	IU refrigerant liquid connection
8	Refrigerant check joint	18	IU electronic expansion valve	29	3-way valve	39	Water inlet (DHW)
9	High pressure switch for protection	19	IU refrigerant strainer	30	T-branch	40	Water outlet (DHW)
		20	Water side heat exchanger	31	Drain port (For DHW)	41	Water inlet (Space heating)
10	Pressure switch for control	21	Manometer			42	Water outlet (Space heating)

N°	Part name
43	Shut-off valve (Accessory)
44	IU refrigerant gas pipe thermistor
45	IU refrigerant liquid pipe thermistor
46	Water inlet thermistor
47	PHEX water outlet thermistor
48	Water outlet heat pump thermistor
49	DHW thermistor
50	Solar coil inlet (For solar models)
51	Solar coil outlet (For solar models)
52	P & T relief valve (For UK market)
53	DHWT sensor (For UK market)

◆ RAS-(4-6)WHVNP + RWD-(4.0-6.0)NW(S)E-(200/260)S(-K)

Heating refrigerant flow	Cooling refrigerant flow	Water flow (Heating/Cooling)	Field supplied piping line

Flare nut connection	Brazed connection	Refrigerant	R410A

N°	Part name
1	Compressor
2	Air side heat exchanger
3	Accumulator
4	Receiver
5	OU electronic expansion valve
6	4-way valve
7	Solenoid gas for by-pass
8	OU refrigerant strainer
9	Distributor
10	Refrigerant check joint
11	High pressure switch for protection
12	Sensor for refrigerant pressure

N°	Part name
13	Stop valve for gas line
14	Stop valve for liquid line
15	Check valve
16	Silencer
17	Pressure switch for control
18	Ambient thermistor
19	Discharge gas thermistor
20	Pipe thermistor
21	OU refrigerant gas connection
22	OU refrigerant liquid connection
23	IU electronic expansion valve
24	IU refrigerant strainer

N°	Part name
25	Water side heat exchanger
26	Manometer
27	Safety valve
28	Drain pipe
29	Low pressure switch
30	Air valve for pressure regulation of expansion vessel
31	Expansion vessel
32	Water electric heater
33	Air purger
34	3-way valve
35	T-branch
36	Drain port (For DHW)

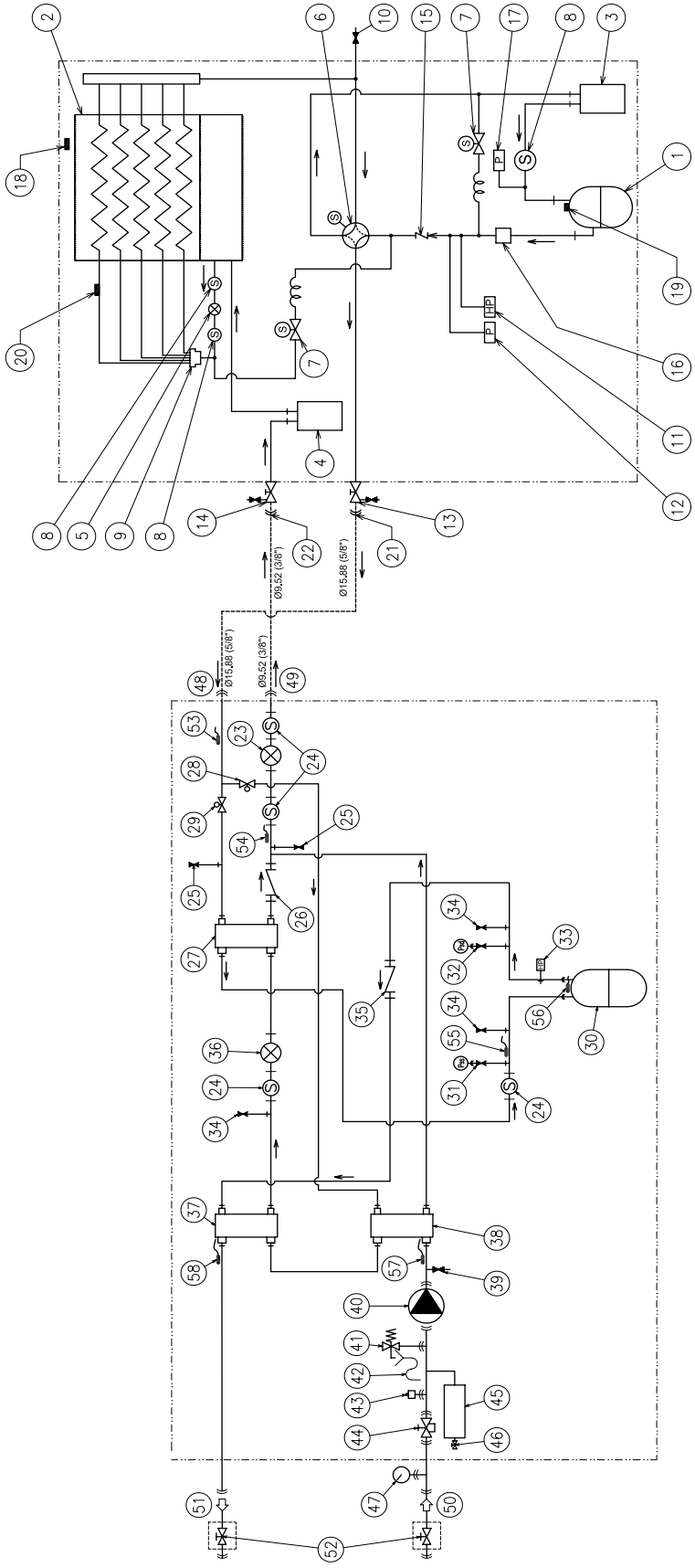
N°	Part name
37	Domestic hot water tank
38	Water strainer
39	Water pump
40	Drain port (For indoor unit water)
41	Manual air purger
42	IU refrigerant gas connection
43	IU refrigerant liquid connection
44	Water inlet (DHW)
45	Water outlet (DHW)
46	Water inlet (Space heating)
47	Water outlet (Space heating)
48	Shut-off valve (Accessory)

N°	Part name
49	IU refrigerant gas pipe thermistor
50	IU refrigerant liquid pipe thermistor
51	Water inlet thermistor
52	PHEX water outlet thermistor
53	Water outlet heat pump thermistor
54	DHW thermistor
55	Solar coil inlet (For solar models)
56	Solar coil outlet (For solar models)
57	P & T relief valve (For UK market)
58	DHWT sensor (For UK market)

8.1.3 YUTAKI S80

8.1.3.1 Indoor unit standalone version

◆ **RAS-(4-6)WHVNP + RWH-(4.0-6.0)(V)NFE**



Heating refrigerant flow	Water flow	Field supplied piping line	Flare nut connection	Brazed connection	Refrigerant 1	Refrigerant 2
					R-410A	R-134a

Nº	Part name
1	OU compressor
2	Air side heat exchanger
3	Accumulator
4	Receiver
5	OU electronic expansion valve
6	4-way valve
7	Solenoid gas for by-pass
8	OU refrigerant strainer
9	Distributor
10	OU R-410A check joint
11	High pressure switch for protection
12	Sensor for refrigerant pressure
13	Stop valve for gas line
14	Stop valve for liquid line

Nº	Part name
15	OU check valve
16	Silencer
17	Pressure switch for control
18	Ambient thermistor
19	OU comp. discharge gas thermistor
20	OU pipe thermistor
21	OU refrigerant gas connection
22	OU refrigerant liquid connection
23	IU electronic expansion valve (R-410A)
24	IU refrigerant strainer
25	IU R-410A check joint
26	Check valve for R-410A

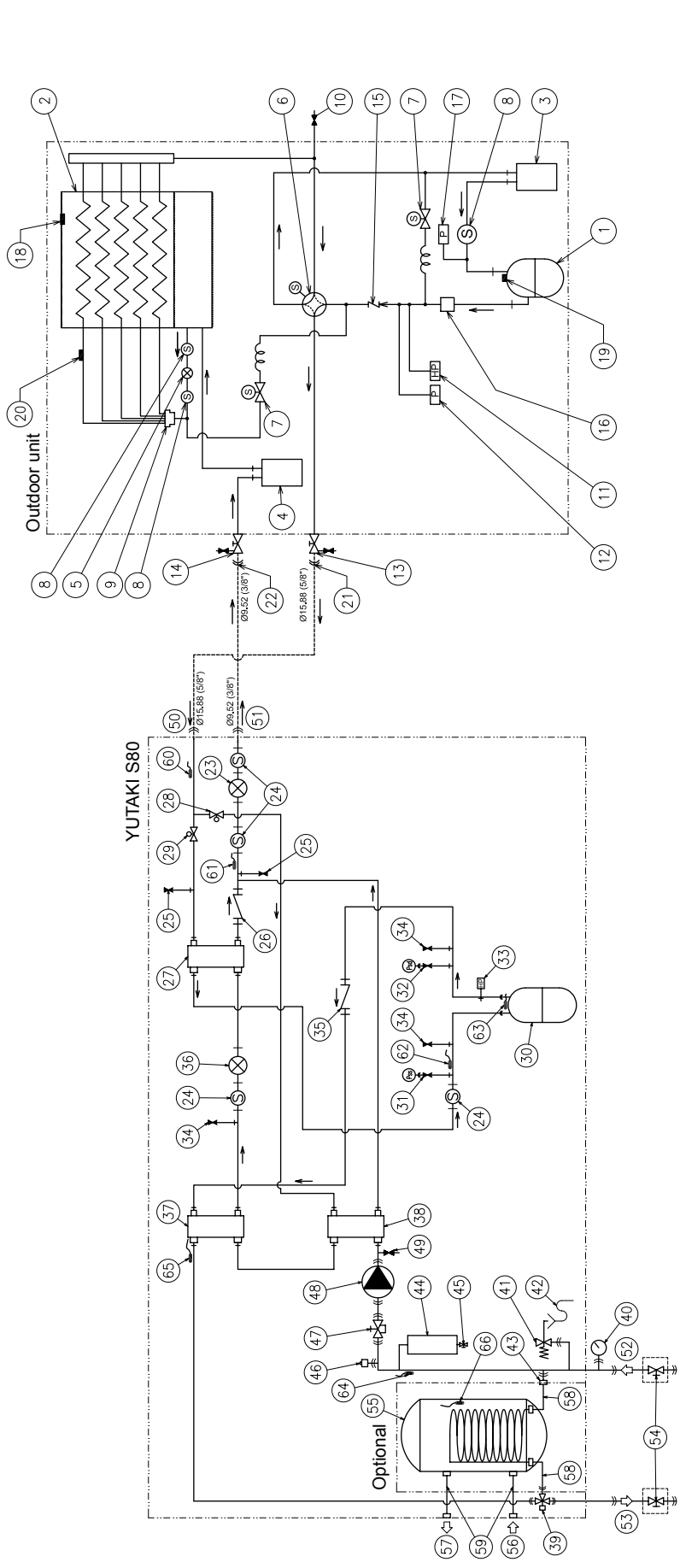
Nº	Part name
27	IU heat exchanger (R410A-R134a)
28	Solenoid valve 1 (For 1 cycle)
29	Solenoid valve 2 (For 2 cycles)
30	IU compressor
31	Low pressure sensor (Ps)
32	High pressure sensor (Pd)
33	IU high pressure switch (protection)
34	R-134a check joint
35	Check valve for R-134a
36	IU electronic expansion valve (R-134a)
37	IU heat exchanger (R134a-H2O)

Nº	Part name
38	IU heat exchanger (R410A-H2O)
39	Water pressure port
40	Water pump
41	Safety valve
42	Drain pipe
43	Air purger
44	Water strainer
45	Expansion vessel
46	Air valve for pressure regulation of expansion vessel
47	Manometer
48	IU refrigerant gas connection
49	IU refrigerant liquid connection
50	Water inlet connection

Nº	Part name
51	Water outlet connection
52	Shut-off valve (Accessory)
53	IU gas pipe thermistor
54	IU liquid pipe thermistor
55	IU comp. suction gas thermistor
56	IU comp. discharge gas thermistor
57	Water inlet thermistor
58	Water outlet thermistor

8.1.3.2 Indoor unit for integrated tank version

◆ **RAS-(4-6)WHVNP + RWH-(4.0-6.0)(V)NFWE**

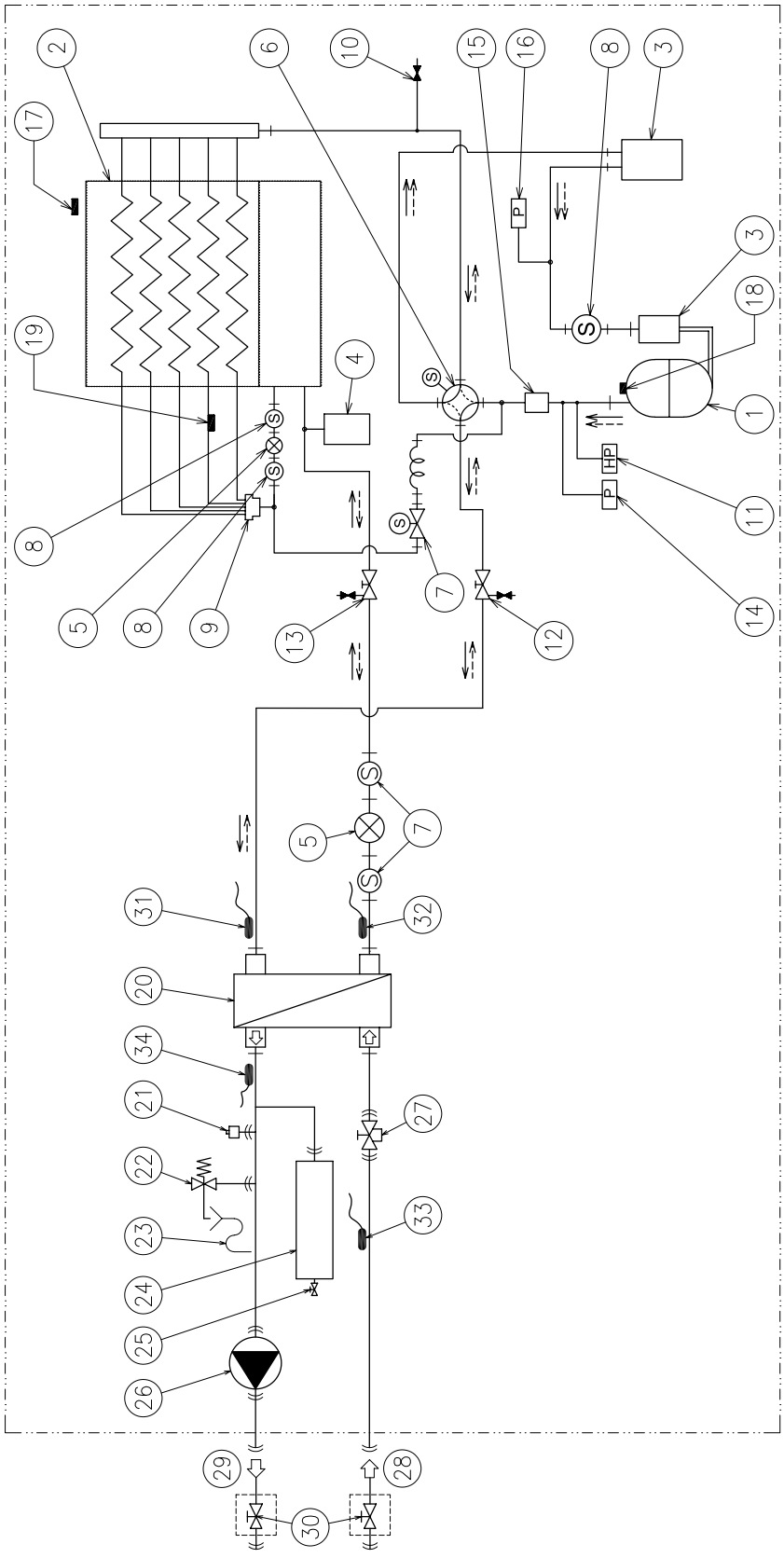


Heating refrigerant flow	Water flow	Field supplied piping line	Flare nut connection	Brazed connection	Refrigerant 1	Refrigerant 2
					R-410A	R-134a

N°	Part name
1	OU compressor
2	Air side heat exchanger
3	Accumulator
4	Receiver
5	OU electronic expansion valve
6	4-way valve
7	Solenoid gas for by-pass
8	OU refrigerant strainer
9	Distributor
10	OU R-410A check joint
11	High pressure switch for protection
12	Sensor for refrigerant pressure
13	Stop valve for gas line
14	Stop valve for liquid line
15	OU check valve
16	Silencer
17	Pressure switch for control
18	Ambient thermistor
19	OU comp. discharge gas thermistor
20	OU pipe thermistor
21	OU refrigerant gas connection
22	OU refrigerant liquid connection
23	IU electronic expansion valve (R-410A)
24	IU refrigerant strainer
25	IU R-410A check joint
26	Check valve for R-410A
27	IU heat exchanger (R410A-R134a)
28	Solenoid valve 1 (For 1 cycle)
29	Solenoid valve 2 (For 2 cycles)
30	IU compressor
31	Low pressure sensor (Ps)
32	High pressure sensor (Pd)
33	IU high pressure switch (protection)
34	R-134a check joint
35	Check valve for R-134a
36	IU electronic expansion valve (R-134a)
37	IU heat exchanger (R134a-H2O)
38	IU heat exchanger (R410A-H2O)
39	3-way valve
40	Manometer
41	Safety valve
42	Drain pipe
43	Connection for DHW tank (outlet)
44	Expansion vessel
45	Air valve for pressure regulation of expansion vessel
46	Air purger
47	Water strainer
48	Water pump
49	Water pressure port
50	IU refrigerant gas connection
51	IU refrigerant liquid connection
52	Water inlet connection
53	Water outlet connection
54	Shut-off valve (Accessory)
55	Domestic hot water tank
56	DHW inlet
57	DHW outlet
58	Flexible pipe for space heating
59	Flexible pipe for DHW
60	IU gas pipe thermistor
61	IU liquid pipe thermistor
62	IU comp. suction gas thermistor
63	IU comp. discharge gas thermistor
64	Water inlet thermistor
65	Water outlet thermistor
66	DHW tank thermistor

8.2 Refrigerant cycle and hydraulic circuit for Monobloc system - YUTAKI M

◆ **RASM-3VNE**



Heating refrigerant flow	Cooling refrigerant flow	Water flow (Heating/Cooling)	Field supplied piping line	Flare nut connection	Brazed connection	Refrigerant	R410A

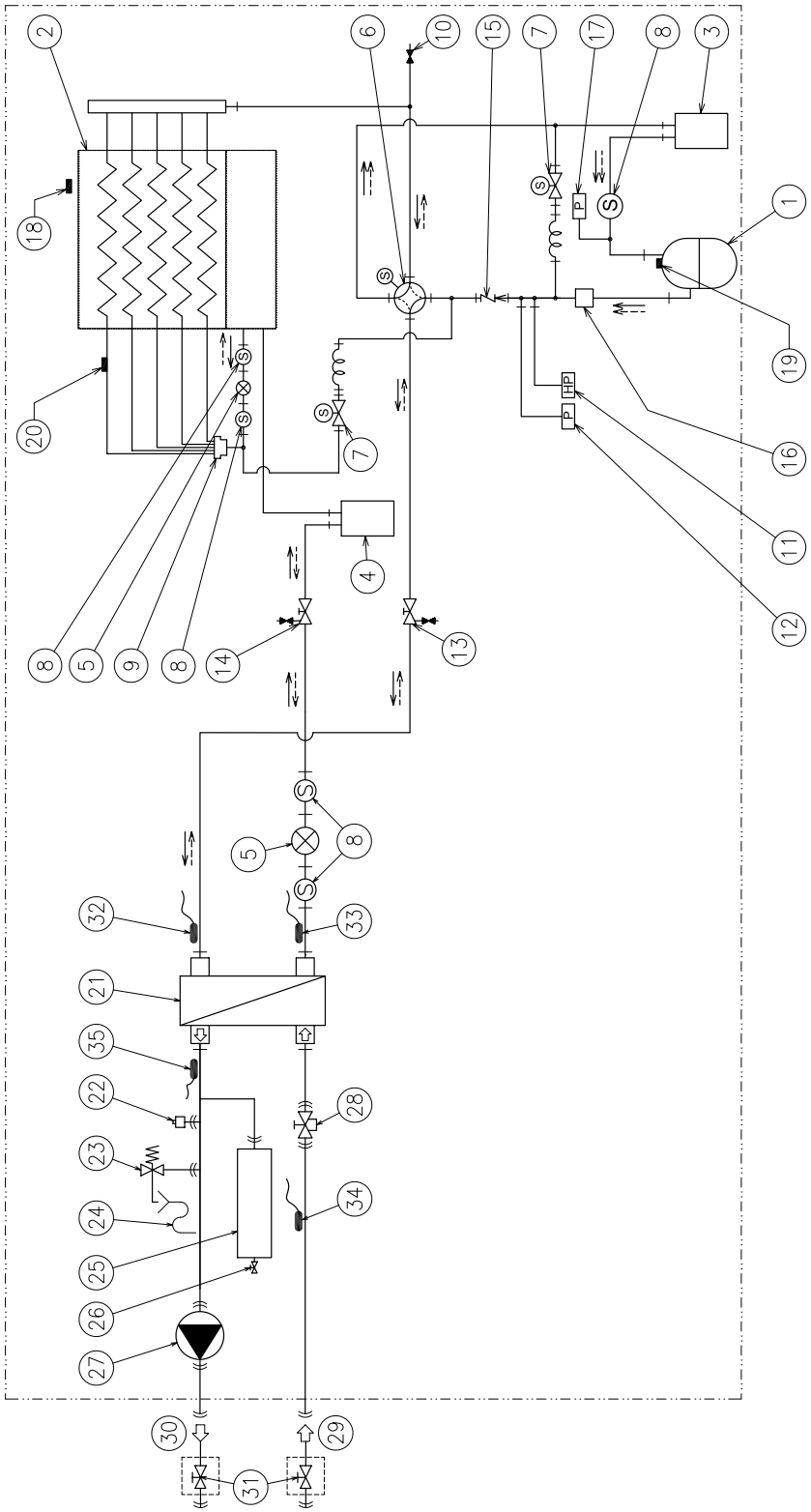
N°	Part name
1	Compressor
2	Air side heat exchanger
3	Accumulator
4	Liquid tank
5	Electronic expansion valve
6	4-way valve
7	Solenoid valve for gas by-pass
8	Refrigerant strainer
9	Distributor

N°	Part name
10	Refrigerant check joint
11	High pressure switch for protection
12	Stop valve for gas line
13	Stop valve for liquid line
14	Sensor for refrigerant pressure
15	Silencer
16	Pressure switch for control
17	Ambient thermistor

N°	Part name
18	Discharge gas thermistor
19	Pipe thermistor
20	Water side heat exchanger
21	Air purger
22	Safety valve
23	Drain pipe
24	Expansion vessel
25	Air valve for pressure regulation of expansion vessel

N°	Part name
26	Water pump
27	Water strainer
28	Water inlet connection
29	Water outlet connection
30	Shut-off valve (Field supplied)
31	Gas pipe thermistor (Heating)
32	Liquide pipe thermistor (Heating)
33	Water inlet thermistor
34	Water outlet thermistor

◆ RASM-(4-6)(V)NE



Heating refrigerant flow	Cooling refrigerant flow	Water flow (Heating/Cooling)	Field supplied piping line	Flare nut connection	Brazed connection	Refrigerant	R410A

N°	Part name
1	Compressor
2	Air side heat exchanger
3	Accumulator
4	Receiver
5	Electronic expansion valve
6	4-way valve
7	Solenoid valve for gas by-pass
8	Refrigerant strainer
9	Distributor

N°	Part name
10	Refrigerant check joint
11	High pressure switch for protection
12	Sensor for refrigerant pressure
13	Stop valve for gas line
14	Stop valve for liquid line
15	Check valve
16	Silencer
17	Pressure switch for control
18	Ambient thermistor

N°	Part name
19	Discharge gas thermistor
20	Pipe thermistor
21	Water side heat exchanger
22	Air purger
23	Safety valve
24	Drain pipe
25	Expansion vessel
26	Air valve for pressure regulation of expansion vessel

N°	Part name
27	Water pump
28	Water strainer
29	Water inlet connection
30	Water outlet connection
31	Shut-off valve (Field supplied)
32	Gas pipe thermistor (Heating)
33	Liquid pipe thermistor (Heating)
34	Water inlet thermistor
35	Water outlet thermistor

9. Refrigerant and water piping

Index

9.1 General notes before performing piping work 218

9.1.1 Piping work 218

9.1.2 Suspension of refrigerant and water pipes 218

9.2 Refrigerant circuit 219

9.2.1 Refrigerant piping 219

9.2.2 Refrigerant charge 220

9.2.2.1 Refrigerant charge amount 220

9.2.2.2 Refrigerant charge before shipment (W_0 (kg)) 221

9.2.3 Precautions in the event of gas refrigerant leaks 221

9.3 Space heating and DHW 223

9.3.1 Additional hydraulic necessary elements for space heating 223

9.3.2 Additional hydraulic necessary elements for DHW 223

9.3.3 Additional hydraulic optional elements (For DHW) 226

9.3.4 Additional hydraulic necessary elements for DHW (only for UK market) 226

9.3.5 Requirements and recommendations for the hydraulic circuit 227

9.3.6 Water piping 228

9.3.7 Water quality 231

9.1 General notes before performing piping work

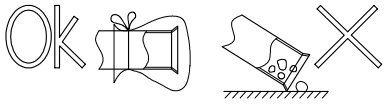
9.1.1 Piping work

- Prepare locally-supplied copper pipes.
- Select the piping size with the correct thickness and correct material able to withstand sufficient pressure.
- Select clean copper pipes. Make sure that there is no dust or moisture inside the pipes. Blow the inside of the pipes with oxygen free nitrogen to remove any dust and foreign materials before connecting them.

NOTE

A system with no moisture or oil contamination will give maximum performance and lifecycle compared to that of a poorly prepared system. Take particular care to ensure that all copper piping is clean and dry internally.

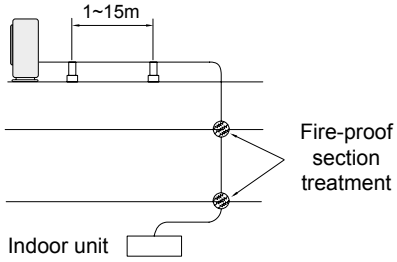
- Cap the end of the pipe when pipe is to be inserted through a wall hole.
- Do not put pipes on the ground directly without a cap or vinyl tape at the end of the pipe.



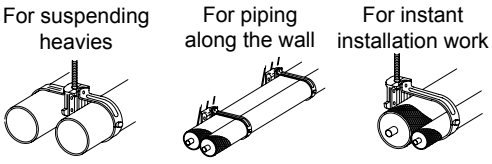
- If piping installation is not completed until next day or over a longer period of time, braze off the ends of the piping and charge with oxygen free nitrogen through a Schrader valve type access fitting to prevent moisture and particle contamination.
- It is advisable to insulate the water pipes, joints and connections in order to avoid heat loss and dew condensation on the surface of the pipes or accidental injures due to excessive heat on piping surfaces.
- Do not use insulation material that contains NH3, as it can damage copper pipe material and become a source of future leakage.
- It is recommended to use flexible joints for the water piping inlet and outlet in order to avoid vibration transmission.
- Refrigerant circuit and Water circuit must be performed and inspected by a licensed technician and must comply with all relevant European and national regulations.
- Proper water pipe inspection should be performed after piping work to assure there is no water leakage in the space heating or DHW circuits.

9.1.2 Suspension of refrigerant and water pipes

- Suspend the refrigerant and water piping at certain points and prevent the refrigerant and 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 refrigerant and water pipes directly with the metal fittings (refrigerant piping may expand and contract). Some examples for suspension method are shown below.



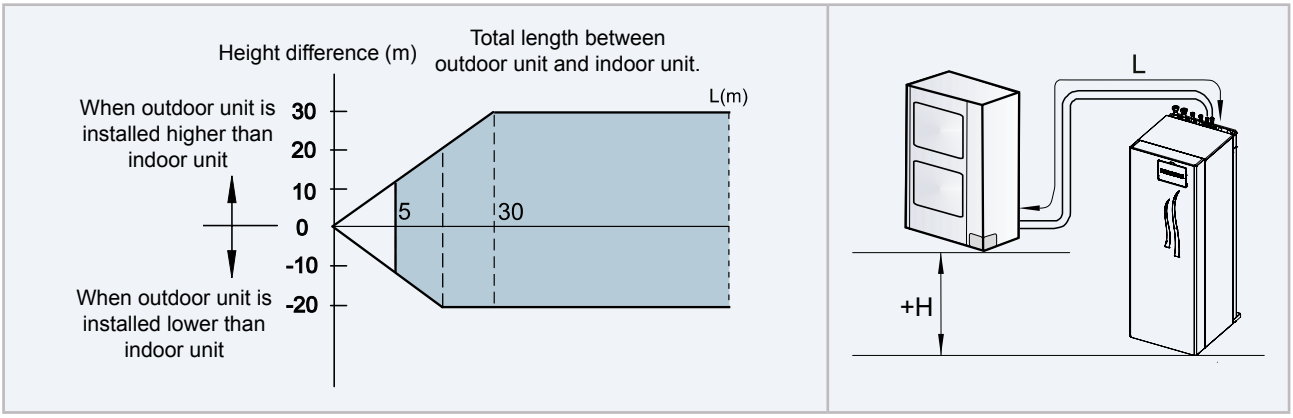
9.2 Refrigerant circuit

9.2.1 Refrigerant piping

◆ Refrigerant piping length between indoor unit and outdoor unit (For YUTAKI (S/S COMBI/S80))

The refrigerant piping length between indoor unit and outdoor unit should be designed using the following chart.

Keep the design point within the area of the chart, which is showing the applicable height difference according to piping length.



Outdoor Unit (HP)		2	2.5	3	4	5	6	8	10
Maximum piping length between outdoor unit and indoor unit (Lmax)	Actual piping length (L)	50 m			75 m			70 m	
	Equivalent piping length	70 m			95 m			90 m	
Minimum piping length between outdoor unit and indoor unit (Lmin)	Actual piping length (L)	5 m							
Maximum height difference between indoor and outdoor unit (H)	Outdoor unit higher than indoor unit	30 m							
	Indoor unit higher than outdoor unit	20 m							

◆ Refrigerant piping size

Piping connection size of outdoor unit & indoor unit

Outdoor unit & YUTAKI M			Indoor unit		
Model	Pipe size		Model	Pipe size	
	Gas pipe	Liquid pipe		Gas pipe	Liquid pipe
2 HP	Ø 12.7 (1/2") (*)	Ø 6.35 (1/4")	2.0 HP	Ø 15.88 (5/8") (*)	Ø 6.35 (1/4")
2.5 HP		Ø 6.35 (1/4") (*)	2.5 HP		Ø 9.52 (3/8") (*)
(3-6) HP	Ø 15.88 (5/8")	Ø 9.52 (3/8")	(3.0-6.0) HP	Ø 15.88 (5/8")	Ø 9.52 (3/8")
8 HP	Ø 25.4 (1")	Ø 9.52 (3/8")	8 HP	Ø 25.4 (1")	Ø 9.52 (3/8")
10 HP		Ø 12.7 (1/2")	10 HP		Ø 12.7 (1/2")

NOTE

- *(*): The refrigerant gas piping size for 2/2.5 HP and the refrigerant liquid piping size of 2.5 HP are different between outdoor and indoor unit, so refrigerant pipe adapters are required. These pipe adapters are factory supplied with the outdoor unit.*

Model	Pipe adapter	
	Gas pipe	Liquid pipe
2 HP	Ø15.88→Ø12.7	-
2.5 HP	Ø15.88→Ø12.7	Ø9.52→Ø6.35

- *For 8 and 10 HP, the gas pipe accessory with a flare nut (factory-supplied silencer) shall be brazed to the field supplied gas line, and connected to the gas valve.*

9.2.2 Refrigerant charge

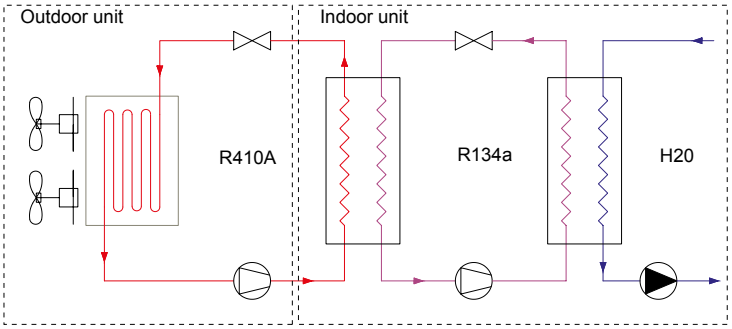
9.2.2.1 Refrigerant charge amount

YUTAKI (S / S COMBI)

The R410A refrigerant is factory charged in the outdoor unit with a refrigerant charge amount for 15 m of piping length between outdoor and indoor unit.

YUTAKI S80

The YUTAKI S80 has two refrigerant circuits. The R410A circuit (1st cycle) works with this refrigerant while the indoor circuit (2nd cycle) works with R134a refrigerant. Piping connections must be performed in the R410A cycle between the outdoor unit and the indoor unit.



- The 1st cycle (R410A) is factory charged in the outdoor unit with a refrigerant charge amount for 15 m of piping length between outdoor and indoor unit.
- The 2nd cycle (R134a) connections are factory installed and refrigerant charged so no piping work or refrigerant charge is needed.

NOTE

Refer to the outdoor unit Installation and operation manual to charge the R410A refrigerant inside the indoor unit.

CAUTION

- *For YUTAKI S80, supply power to the indoor unit and switch the DSW1-2 ON of its PCB1. Thereby, solenoid valves SV1 and SV2 of the indoor unit will open to allow the operation of vacuum and refrigerant charge inside the indoor unit. It is very important to remind to switch the DSW1-2 OFF when finishing the whole procedure.*
- *In some circumstances and depending on installation conditions (long pipe length between outdoor and indoor units, different height between units, certain setting conditions, etc…) may drive to protection code P-06, and in some sites also to alarm 103 or 104. In order to increase the endurance against this issue, it is recommended to add extra refrigerant R410A charge +20% in the Outdoor unit. Application guidelines:*

	Alarm 103 or 104	Action
Normal	No Alarm	Do nothing. Keep your current software and charge quantity
Alarm 103 & 104 (CASE A)	Only one alarm at commissioning procedure or only one case (after this, no alarms has been found)	Revise commissioning aspects following YUTAKI S80 Service Manual (correct vacuuming, compressor C-heater enough long operation prior to starting, etc).
Alarm 103 & 104 (CASE B)	Alarm showed randomly often.	It is necessary to charge additional +20% of refrigerant R410A of the outdoor unit nominal charge

YUTAKI M

YUTAKI M unit is a Monobloc system (closed refrigerant circuit) which has been factory charged, so additional refrigerant charge is not required.

9.2.2.2 Refrigerant charge before shipment (W_0 (kg))

YUTAKI (S / S COMBI)

Outdoor unit model	W_0 (kg)
RAS-2WHVNP	1.4
RAS-2.5WHVNP	1.5
RAS-3WHVNP	1.7
RAS-4WH(V)NPE	3.3
RAS-(5/6)WH(V)NPE	3.4
RAS-8WHNPE	5.0
RAS-10WHNPE	5.3

YUTAKI S80

Model		W_0 (kg) R410A	W_0 (kg) R134a
Outdoor unit	RAS-4WH(V)NPE	3.3	-
	RAS-(5/6)WH(V)NPE	3.4	-
Indoor unit	RWH-(4.0-6.0)(V)NF(W)E	-	1.9

YUTAKI M

Model	W_0 (kg)
RASM-3VNE	2.4
RASM-4(V)NE	2.8
RASM-(5/6)(V)NE	3.1

9.2.3 Precautions in the event of gas refrigerant leaks

The installers and those responsible for drafting the specifications are obliged to comply with local safety codes and regulations in the case of refrigerant leakage.

⚠ CAUTION

- *Check for refrigerant leakage in detail. If a large refrigerant leakage occurred, it would cause difficulty with breathing or harmful gases would occur if a fire were in the room.*
- *If the flare nut is tightened too hard, it may crack over time and cause refrigerant leakage.*

◆ Maximum permitted concentration of HFCs

YUTAKI (S / S COMBI / S80)

The refrigerant R410A (charged in the outdoor unit) and the refrigerant R134a (in case of YUTAKI S80 indoor unit) are incombustible and non-toxic gases. However, if leakage occurs and gas fills a room, it may cause suffocation.

The maximum permissible concentration of HFC gas according to EN378-1 is:

Refrigerant	Maximum permissible concentration (kg/m³)
R410A	0.44
R134a	0.25

The minimum volume of a closed room where the system is installed to avoid suffocation in case of leakage is:

System combination		Minimum volume (m³)
YUTAKI (S / S COMBI)	2 HP	3.2
	2.5 HP	3.5
	3 HP	3.9
	4 HP	7.5
	5/6 HP	7.8
YUTAKI S	8 HP	11.4
	10 HP	12.1
YUTAKI S80	4-6 HP	7.6

The formula used for the calculation of the maximum allowed refrigerant concentration in case of refrigerant leakage is the following:

R — = C V	R: Total quantity of refrigerant charged (kg) V: Room volume (m³) C: Refrigerant concentration

If the room volume is below the minimum value, some effective measure must be taken account after installing to prevent suffocation in case of leakage.

◆ Countermeasure in the event of possible refrigerant leakage

The room must have the following features to prevent suffocation in case a refrigerant leakage occurs:

1 Provide a shutterless opening which will allow fresh air to circulate into the room.

2 Provide a doorless opening of 0.15% or more size to the floor area.

3 There must be a ventilator fan connected to a gas leak detector, with a ventilator capacity of 0.4 m³/min or higher per Japanese refrigeration ton (= compressor displacement volume / (5.7 m³/h (R410A) or 14.4 m³/h (R134a)) of the air conditioning system using the refrigerant.

Model	Tonnes
RAS-2WHVNP	0.88
RAS-2.5WHVNP	1.14
RAS-3WHVNP	1.35
RAS-(4-6)WH(V)NPE	2.27
RAS-8WHNPE	3.16
RAS-10WHNPE	4.11

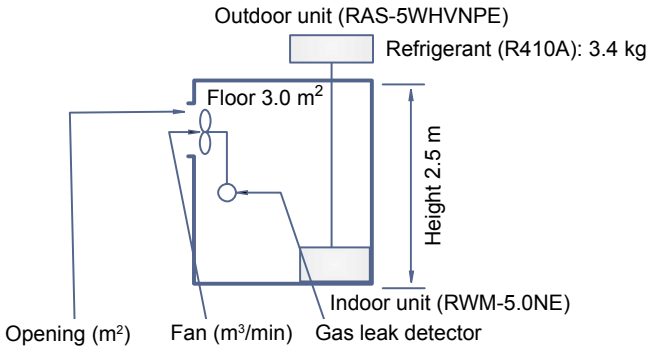
Model		Tonnes	
		R410A	R134a
Outdoor unit	RAS-(4-6)WH(V)NPE	2.27	-
Indoor unit	RWH-(4.0-6.0)(V)NF(W)E	-	1.61

NOTE

Always take the maximum value between the R410A and R134a.

4 Pay special attention to the place, such as a basement, etc., where the refrigerant can stay, since refrigerant is heavier than air.

Example:



R (kg)	V (m³)	C (kg/m³)	Countermeasure
3.4	7.5	0.46	1.0 m³/min fan linked with gas leak detector or 0.5 m² opening

YUTAKI M

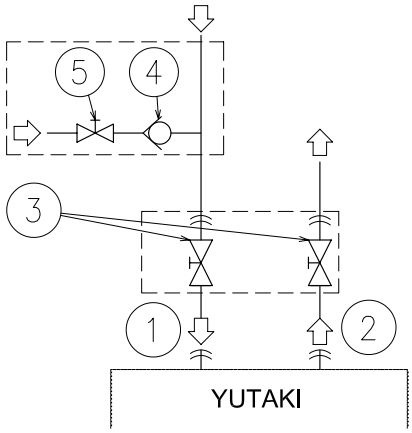
YUTAKI M is an appliance designed to be installed outdoors. Should it be covered by an enclosure, this shall be done according to the EN378 (KHK standard can also be considered as a reference), so that the refrigerant concentration be below 0.44 kg/m³ (i.e., provide a shutterless opening that will allow fresh air to flow into the enclosure).

9.3 Space heating and DHW

DANGER

Do not connect the power supply to the indoor unit prior to filling the space heating and DHW circuits with water and checking water pressure and the total absence of any water leakage.

9.3.1 Additional hydraulic necessary elements for space heating



Type	Nº	Part name
Piping connections	1	Water inlet (Space heating)
	2	Water outlet (Space heating)
Factory supplied	3	Shut-off valve (factory-supplied) (Field-supplied for YUTAKI M series)
Accessories	4	Water check valve (ATW-WCV-01 accessory)
Field supplied	5	Shut-off valve

The following hydraulic elements are necessary to correctly perform the space heating water circuit:

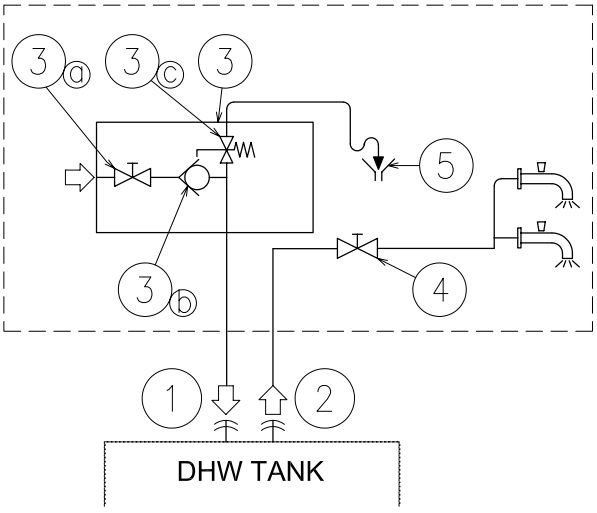
- **Two shut-off valves (factory supplied accessory except for YUTAKI M series)** (3) must be installed in the indoor unit. One at the water inlet connection (1) and the other at the water outlet connection (2) in order to make easier any maintenance work.
- **A water check valve (ATW-WCV-01 accessory)** (5) with 1 shut-off valve (field supplied) (4) must be connected to the water filling point when filling the indoor unit. The check valve acts as a safety device to protect the installation against back pressure, back flow and back syphon of non-potable water into drinking water supply net.

9.3.2 Additional hydraulic necessary elements for DHW

The next hydraulic elements are necessary to correctly perform the domestic hot water circuit:

◆ COMMON

The following elements are required for all YUTAKI units.



Type	Nº	Part name	
Piping connections	1	Water inlet (DHW)	
	2	Water outlet (DHW)	
Field supplied	3	Pressure and temperature relief valve	
		3a	Shut-off valve
		3b	Water check valve
		3c	Pressure relief valve
	4	Shut-off valve	
	5	Draining	

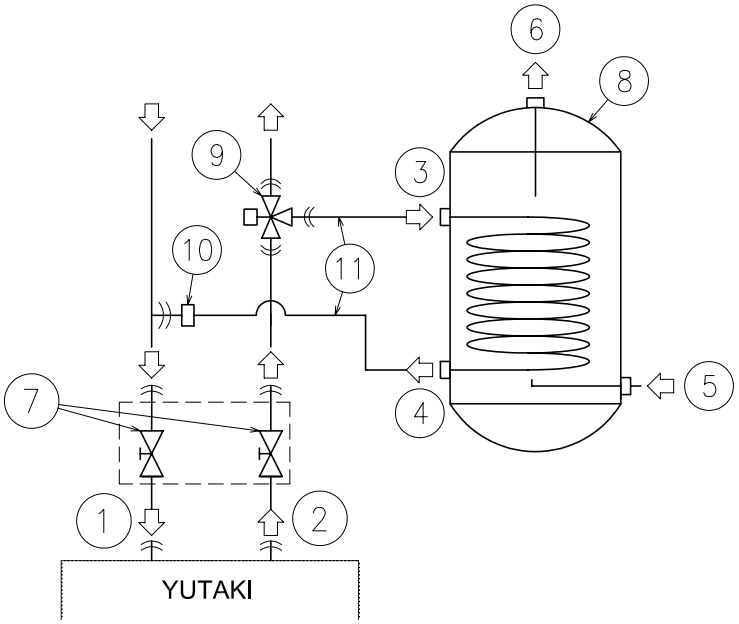
- **1 Shut-off valve (field supplied)**: one shut-off valve (4) must be connected after the DHW outlet connection of the DHW tank (2) in order to make easier any maintenance work.

- **A Security water valve (Field-supplied)**: this accessory (3) is a pressure and temperature relief valve that must be installed as near as possible to the DHW inlet connection of the DHW tank (1). It should ensure a correct draining (5) for the discharge valve of this valve. This security water valve should provide the following:
  - Pressure protection
  - Non-return function
  - Shut-off valve
  - Filling
  - Draining

NOTE

The discharge pipe should always be open to the atmosphere, free of frost and in continuous slope to the down side in case that water leakage exists.

◆ YUTAKI S / M / S80 TYPE 1 (Version for operation in DHW but with a remote tank)



Type	Nº	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)
Factory supplied	7	Shut-off valve (factory-supplied) (Field-supplied for YUTAKI M series)
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

YUTAKI S, YUTAKI M and YUTAKI S80 TYPE 1 are not factory-supplied ready for DHW operation, but they can be used for the production of DHW if the following elements are installed:

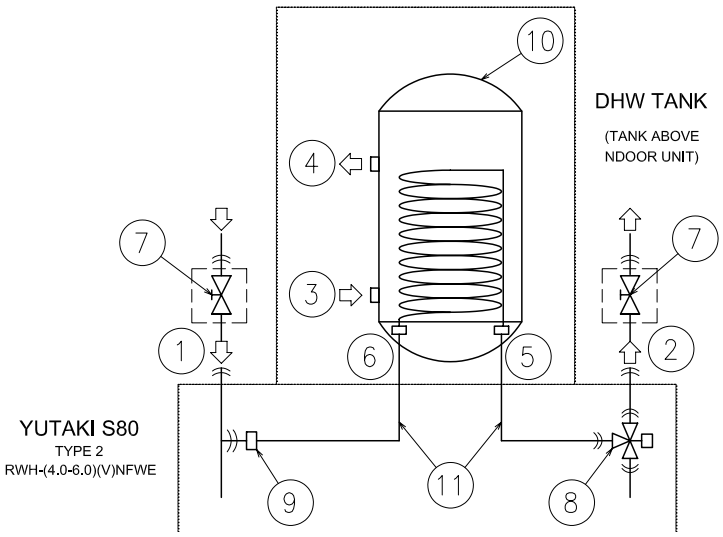
- **A domestic hot water tank (DHWT-(200/260)S-3.0H2E accessory)** (8) has to be installed in combination with the indoor unit.
- **A 3-way valve (ATW-3WV-01 accessory)** (9) must be connected at one point of the water outlet pipe of the installation.
- **A T-branch (field supplied)** (10) must be connected at one point of the water inlet pipe of the installation.
- **Two water pipes (field supplied)** (11). One pipe between 3-way valve and the heating coil inlet (3) of the DHW tank, the other one between the T-branch and the heating coil outlet (4) of the DHW tank.

◆ YUTAKI S COMBI

YUTAKI S COMBI is factory-supplied ready for DHW operation (Fitted with DHW tank and 3-way valve). Only the "Common" elements are required.

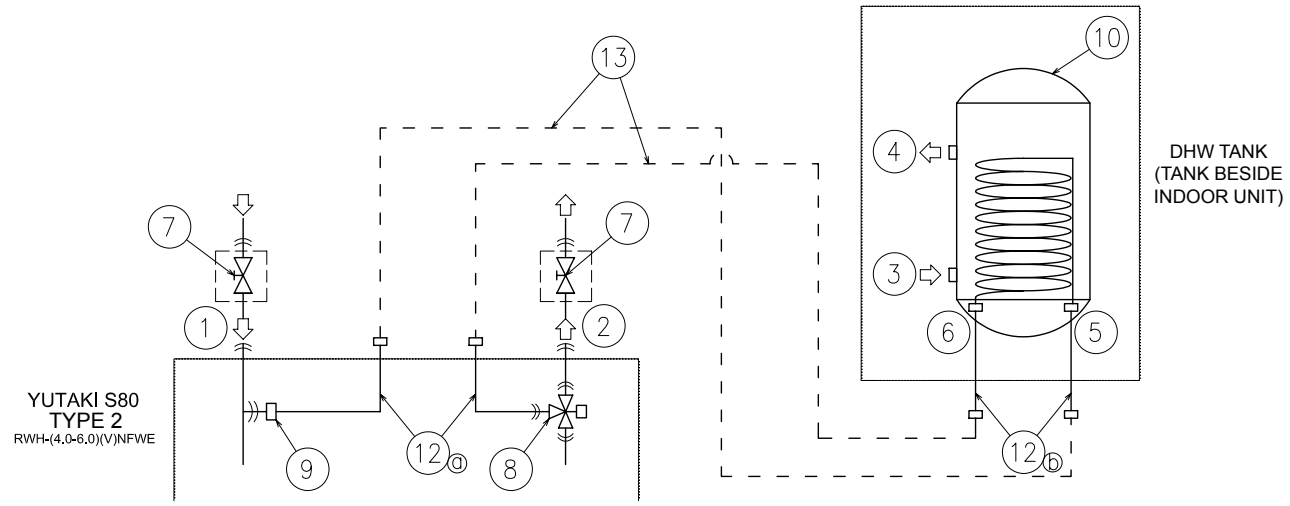
◆ YUTAKI S80 TYPE 2 (Version for operation with HITACHI DHW tank)

DHW tank integrated above the indoor unit



Type	Nº	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)
Factory supplied	7	Shut-off valve (factory-supplied)
	8	3-way valve
	9	T-branch
Accessories	10	Domestic hot water tank (DHWS(200/260)S-2.7H2E accessory)
	11	Heating coil pipes
	12	Flexible water pipe kit (ATW-FWP-02 accessory)
		12a Indoor unit pipes
		12b DHW tank pipes
Field supplied	13	Water pipes between indoor unit and DHW tank

DHW tank beside the indoor unit

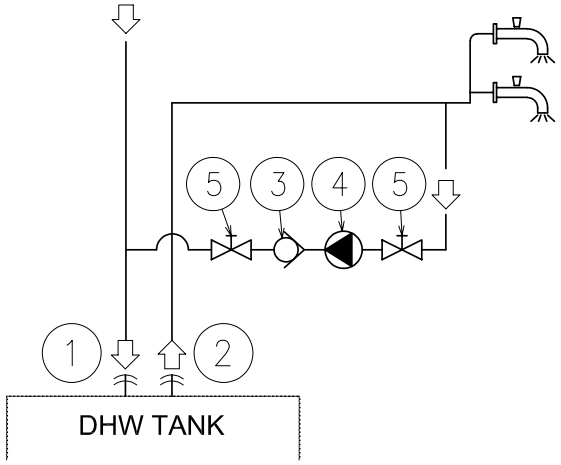


When installing the YUTAKI S80 indoor unit TYPE 2 (RWH-(4.0-6.0)(V)NFWE) in combination with the HITACHI DHW tank (DHWS(200/260)S-2.7H2E) the following elements to provide DHW operation are needed:

- **The YUTAKI S80 domestic hot water tank (DHWS(200/260)S-2.7H2E(-W) accessory)** (10) is required in combination with YUTAKI S80 indoor unit TYPE 2. This tank accessory is factory-supplied with two flexible water pipes (11). Respect the following instructions depending on the DHW tank location (integrated above the indoor unit or beside it).
  - For DHW tank integrated above the indoor unit, use one of the factory-supplied pipes (11) for the connection between 3-way valve and the heating coil inlet coil of the DHW tank, and the other one for the connection between the T-branch and the heating coil outlet coil of the DHW tank accessory.
  - For DHW tank beside the indoor unit (both right or left side), the pipes factory-supplied with the DHW tank accessory (11) are not required. In this case, the dedicated HITACHI flexible water pipe kit (ATW-FWP-02 accessory) (12) is needed. This kit is provided with the following items:
    - 4 flexible water pipes (Two pipes (12a) to connect to the indoor unit (3-way (8) valve and T-branch (9)) and other two pipes (12b) to connect to the heating coil inlet/outlet connections of the DHW tank (5-6). To connect the indoor unit with the DHW tank, two additional field-supplied pipes are required (13).
    - 9 gaskets (2 gaskets for each flexible water pipe end and 1 spare gasket).
    - 3 extension cables (1 for the tank's electric heater, 1 for the tank's thermistor and 1 for the unit controller).

9.3.3 Additional hydraulic optional elements (For DHW)

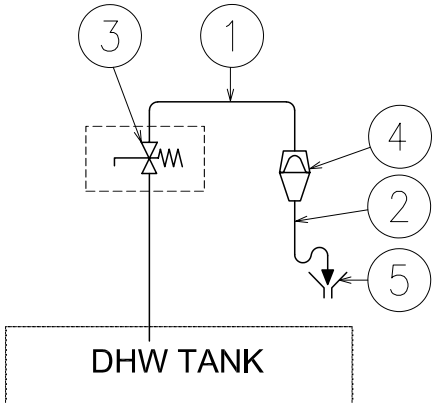
In case of a recirculation circuit for the DHW circuit:



Type	Nº	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-off valve

- 1 Recirculation water pump (field supplied): this water pump (3) will help to correctly recirculate the hot water to the DHW inlet.
- 1 Water check valve (ATW-WCV-01 accessory): this HITACHI accessory (4) is connected after the recirculation water pump (31) in order to ensure the non-return of water.
- 2 Shut-off valves (field supplied) (5): one before the recirculation water pump (3) and other after the water check valve accessory (4).

9.3.4 Additional hydraulic necessary elements for DHW (only for UK market)



Type	Nº	Part name
Piping connections	1	T&P relief valve outlet pipe Ø15 (factory supplied)
	2	Tundish outlet pipe (Field supplied)
Accessories	3	Pressure and Temperature relief valve (Factory supplied)
Field supplied	4	Tundish (Field supplied)
	5	Drain (Field supplied)

The following accessories are necessary for the compliance of the YUTAKI S COMBI for UK market with the UK requirements referred in the UK Building Regulations 2000.

- 1 temperature and pressure relief valve (factory supplied), fitted at the hottest part of the DHW tank. This device protects the unit of excessive temperature (>96º C) and excessive pressure (>7 bar) in the DHW tank. Additionally, a Ø15 diameter pipe (factory supplied)is fitted to the outlet of the relief valve and drives the discharge to the tundish (4).
- 1 tundish(4)(field supplied), installed in a vertical position, with no more than 600 mm of pipe between the valve outlet and the tundish.
- 1 Tundish outlet pipe (2)(field supplied) with a vetical section at least 300 mm long below the tundish(4), before any elbows or bends in the pipework. This pipe should be made of metal or other material that has been demonstrated to be capable of safety withstanding temperatures and pressure of the water discharged, as it is refferred in the UK Building Regulations.
- The discharge pipe from the tundish (2) must terminate in a safe place where is no risk to persons in the vicinity of the discharge. the discharge will consist of high water temperature and pressure.

9.3.5 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.
- The indoor unit is equipped with an air purger (factory supplied) at the highest location of the Indoor 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 below 12 litres/minute (6 litres/minute for 2.0/2.5/3.0HP unit), alarm is 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 indoor unit water strainer.
- When selecting a DHW tank, take into consideration that 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.
- For YUTAKI S80: When using the indoor unit in combination with the YUTAKI S80 DHW tank, the heating coil of the tank is placed in a higher position than the indoor unit air purger. Then, to totally purge the space heating circuit, it is very important that the heating coil of the tank is fully air purged.
- If the domestic cold water entry pressure is higher than the equipment's design pressure (6 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 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).
- Do not add any type of glycol to the water circuit in YUTAKI S / S COMBI / S80 units. The use of glycol is only allowed for YUTAKI M units in order to prevent water pipes from freezing. If using glycol for the water circuit of YUTAKI M units, refer to the specific information throughout the document.
- Drain taps must be provided at all low points of the installation to permit complete drainage of the circuit during servicing.

9.3.6 Water piping

◆ Water piping length

Consider the following guidelines when designing the water circuit.

Item	YUTAKI S	YUTAKI S COMBI	YUTAKI S80		
			DHW tank above the indoor unit	DHW tank beside the indoor unit	
				Type 1	Type 2
Maximum water piping length between indoor unit and DHW tank	10 m	--	--	10 m	10 m
Maximum water piping length between indoor unit and 3-way valve	3 m	--	--	3 m	--
Maximum water piping length between 3-way valve and DHW tank	10 m	--	--	10 m	10 m

Item	YUTAKI M
Maximum water piping length between outdoor unit and domestic hot water tank	10 m
Maximum water piping length between outdoor unit and domestic hot water tank 3-way valve	10 m
Maximum total piping combination	10 m

NOTE

DHW Piping length. It is recommended to avoid long runs of piping between the domestic hot water tank and hot water outlet side in order to avoid heat losses.

◆ Water piping size

YUTAKI S

(inches)

Model	Space heating pipes connection		
	Inlet connection	Outlet connection	Shut-off valves
(2.0-3.0)HP	G 1” (female)	G 1” (female)	G 1” (male) - G 1” (male)
(4.0-10.0)HP	G 1-1/4” (female)	G 1-1/4” (female)	G 1-1/4” (male) - G 1-1/4” (male)

YUTAKI S COMBI

(inches)

Model	Space heating connection			DHW connection			Solar connection (*)	
	Inlet connection	Outlet connection	Shut-off valves	Inlet connection	Outlet connection	P & T relief valve (**)	Inlet connection	Outlet connection
(2.0-3.0)HP	G 1” (female)	G 1” (female)	G 1” (male) - G 1” (male)	G 3/4” (female)	G 3/4” (female)	Ø15 mm	G 1/2” (female)	G 1/2” (female)
(4.0-6.0)HP	G 1-1/4” (female)	G 1-1/4” (female)	G 1-1/4” (male) - G 1-1/4” (male)	G 3/4” (female)	G 3/4” (female)	Ø15 mm	G 1/2” (female)	G 1/2” (female)

(*): Only for models for solar combination.

(**): Only for models for UK market.

YUTAKI M

(inches)

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

YUTAKI S80 indoor unit

Version for indoor unit alone (RWH-(4.0-6.0)(V)NFE)

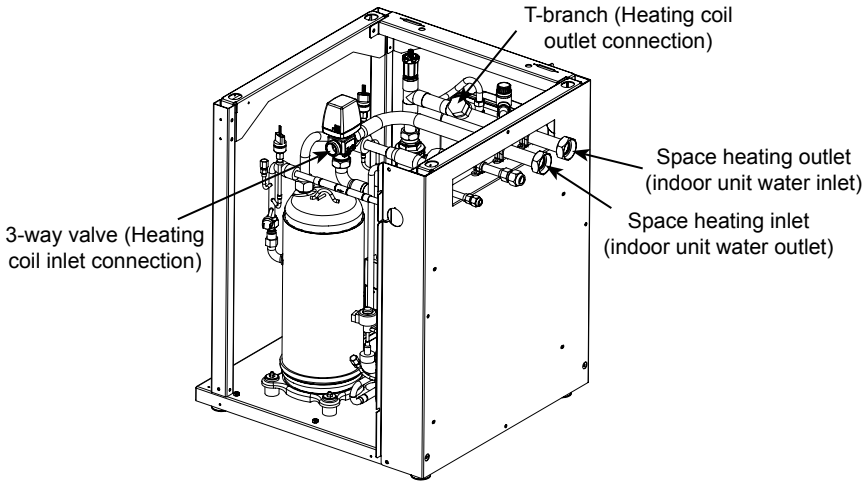
(inches)

Model	Space heating connection		
	Inlet connection	Outlet connection	Shut-off valves
(4.0-6.0)HP	G 1-1/4" (female)	G 1-1/4" (female)	G 1-1/4" (male) - G 1-1/4" (male)

Version for combination with DHW tank (RWH-(4.0-6.0)(V)NFWE)

(inches)

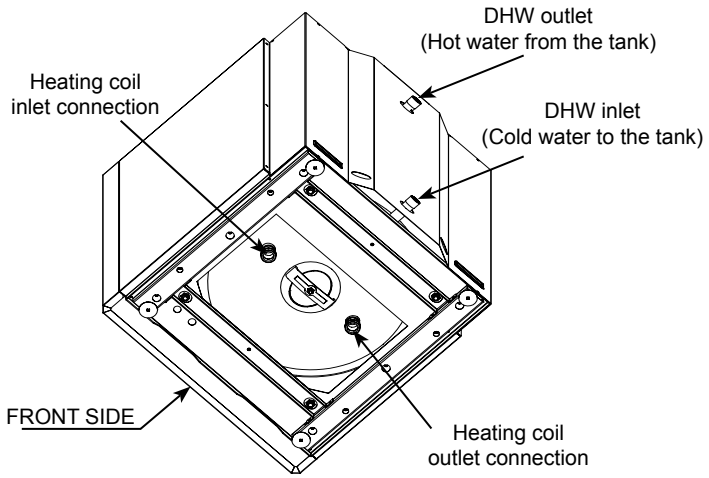
Model	Space heating connection			Heating coil connection	
	Inlet connection	Outlet connection	Shut-off valves	Inlet connection (3-way valve)	Outlet connection (T-branch)
(4.0-6.0)HP	G 1-1/4" (female)	G 1-1/4" (female)	G 1-1/4" (male) - G 1-1/4" (male)	G 1" (female)	G 1" (female)



YUTAKI S80 Domestic hot water tank accessory (DHWS(200/260)S-2.7H2E(-W))

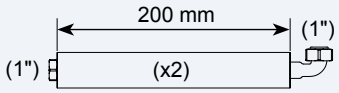
(inches)

Model	Heating coil connection		DHW connection	
	Inlet connection	Outlet connection	Inlet connection	Outlet connection
DHWS(200/260)S-2.7H2E(-W)	G 1" (male)	G 1" (male)	G 3/4" (male)	G 3/4" (male)



Heating coil pipes (Factory-supplied with the DHW tank accessory (DHWS(200/260)S-2.7H2E(-W)))

The domestic hot water tank accessory for combination with YUTAKI S80 indoor unit is factory-supplied with two flexible water pipes for the connection between the indoor unit and the heating coil of the domestic hot water tank, **when the DHW tank is installed integrated above the indoor unit**.

Heating coil pipes	
Item	**Connection**
	One pipe for the connection between 3-way valve connection and heating coil inlet connection of the tank. The other one for the connection between T-branch connection and heating coil outlet connection of the tank.

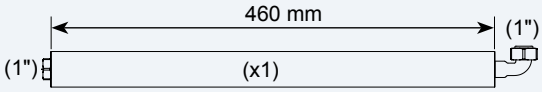
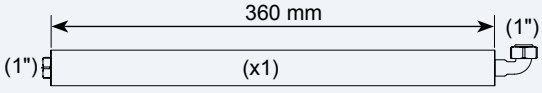
Flexible water pipe kit (ATW-FWP-02) - For domestic hot water tank installed beside the indoor unit

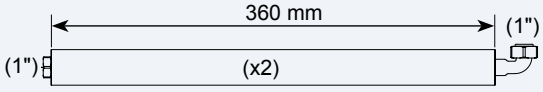
For DHW tank beside the indoor unit (both right or left side), the heating coil pipes factory-supplied with the DHW tank accessory are not required. In this case, the dedicated HITACHI flexible water pipe kit (ATW-FWP-02 accessory) is needed. This kit is provided with the following items:

- 4 flexible water pipes:
  - 2 pipes to connect to the indoor unit (3-way valve and T-branch)
  - 2 pipes to connect to the heating coil inlet/outlet connections of the DHW tank accessory (DHWS(200/260)S-2.7H2E(-W)).
- 9 gaskets (2 gaskets for each flexible water pipe end and 1 spare gasket).
- 3 extension cables (1 for the tank's electric heater, 1 for the tank's thermistor and 1 for the unit controller).



It is necessary to identify the function of each water pipe.

Heating coil pipes for the indoor unit	
Item	**Connection**
	To connect to the 3-way valve heating coil inlet connection.
	To connect to the T-branch heating coil outlet connection.

Heating coil pipes for the DHW tank accessory	
Item	**Connection**
	One pipe to connect to the heating coil inlet connection of the tank accessory. The other one to connect to the heating coil outlet connection of the tank accessory.

9.3.7 Water quality

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. Should the results of the analysis be 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 $CaCO_3$.*

◆ Recommendations for the DHW circuit

The following is the recommended standard water quality.

Item	DHW space	Tendency (1)	
	Water supplied (3)	Corrosion	Deposits of scales
Electrical Conductivity (mS/m) (25°C) {µS/cm} (25 °C) (2)	100~2000	●	●
Chlorine Ion (mg Cl^-/l)	max. 250	●	
Sulphate (mg/l)	max. 250	●	
Combination of chloride and sulphate (mg/l)	max. 300	●	●
Total Hardness (mg $CaCO_3$ /l)	60~150		●

NOTE

- *(1): The mark "●" in the table means the factor concerned with the tendency of corrosion or deposits of scales.*
- *(2): The value shown in "{}" are for reference only according to the former unit.*
- *(3): Water range will be according s/UNE 112076:2004 IN.*

10. Electrical and control settings

Index

10.1 General check 234
10.2 System wiring diagram 237
10.3 Electrical connection 239
10.3.1 Wiring size 239
10.3.2 Minimum requirements of the protection devices 242
10.4 Transmission wiring 244
10.4.1 YUTAKI units 244
10.4.2 YUTAKI CASCADE CONTROLLER 245
10.5 Optional indoor unit wiring (accessories) 247
10.6 Setting of DIP switches and RSW switches 251
10.6.1 Outdoor unit 251
10.6.1.1 Location of DIP switches and rotary switches 251
10.6.1.2 Function of DIP switches and rotary switches 252
10.6.1.3 LED indication 253
10.6.2 YUTAKI unit 254
10.6.2.1 Location of DIP switches and rotary switches 254
10.6.2.2 Function of DIP switches and rotary switches 254
10.6.2.3 LED indication 258

10.1 General check

- Make sure that the following conditions related to power supply installation are satisfied:
  - The power capacity of the electrical installation is large enough to support the power demand of the YUTAKI system (outdoor unit + indoor unit + DHW tank (if apply)).
  - The power supply voltage is within ±10% of the rated voltage.
  - The impedance of the power supply line is low enough to avoid any voltage drop of more than 15% of the rated voltage.
- Following the Council Directive 2004/108/EC, relating to electromagnetic compatibility, the table below indicates the Maximum permitted system impedance Z_{max} at the interface point of the user's supply, in accordance with EN61000-3-11.

◆ Split system - Outdoor unit

Model	Power supply	Z_{max} (Ω)
RAS-2WHVNP	1~ 230V 50Hz	-
RAS-2.5WHVNP		-
RAS-3WHVNP		0.42
RAS-4WHVNPE		0.25
RAS-5WHVNPE		0.25
RAS-6WHVNPE		0.25
RAS-4WHNPE	3N~ 400V 50Hz	-
RAS-5WHNPE		-
RAS-6WHNPE		-
RAS-8WHNPE		-
RAS-10WHNPE		-

◆ Split system - Indoor unit

YUTAKI S

Model	Power supply	Operation mode	Z_{max} (Ω)
RWM-(2.0-3.0)NE(-W)	1~ 230V 50Hz	Without electric heaters	-
		With electric heater	-
		With DHW tank heater	-
		With electric and DHW tank heaters	0.26
RWM-(4.0-6.0)NE(-W)	1~ 230V 50Hz	Without electric heaters	-
		With electric heater	0.26
		With DHW tank heater	-
		With electric and DHW tank heaters	0.17
	3N~ 400V 50Hz	Without electric heaters	-
		With electric heater	-
		With DHW tank heater	-
		With electric and DHW tank heaters	-
RWM-(8.0/10.0)NE(-W)	3N~ 400V 50Hz	Without electric heaters	-
		With electric heater	-
		With DHW tank heater	-
		With electric and DHW tank heaters	0.45

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".*
- *In case of three phases connection, Z_{max} is not considered.*

YUTAKI S COMBI

Model	Power supply	Operation mode	Z_{max} (Ω)
RWD-(2.0-3.0) NW(S)E-(200/260)S(-K)(-W)	1~ 230V 50Hz	Without electric heaters	-
		With electric heater	-
		With DHW tank heater	-
		With electric and DHW tank heaters	0.28
RWD-(4.0-6.0) NW(S)E-(200/260)S(-K)(-W)	1~ 230V 50Hz	Without electric heaters	-
		With electric heater	0.26
		With DHW tank heater	-
		With electric and DHW tank heaters	0.18
	3N~ 400V 50Hz	Without electric heaters	-
		With electric heater	-
		With DHW tank heater	-
		With electric and DHW tank heaters	-

YUTAKI S80

Indoor unit alone

Model	Power supply	Operation mode	Z_{max} (Ω)
RWH-4.0VNFE	1~ 230V 50Hz	Without DHW tank heater	0.31
		With DHW tank heater	0.20
RWH-5.0VNFE		Without DHW tank heater	0.27
		With DHW tank heater	0.18
RWH-6.0VNFE		Without DHW tank heater	0.24
		With DHW tank heater	0.17
RWH-4.0NFE	3N~ 400V 50Hz	Without DHW tank heater	-
		With DHW tank heater	0.38
RWH-5.0NFE		Without DHW tank heater	-
		With DHW tank heater	0.38
RWH-6.0NFE		Without DHW tank heater	-
		With DHW tank heater	0.38

Indoor unit in combination with DHW tank

Model	Power supply	Operation mode	Z_{max} (Ω)
RWH-4.0VNFWE	1~ 230V 50Hz	Without DHW tank heater	0.31
		With DHW tank heater	0.21
RWH-5.0VNFWE		Without DHW tank heater	0.27
		With DHW tank heater	0.19
RWH-6.0VNFWE		Without DHW tank heater	0.24
		With DHW tank heater	0.17
RWH-4.0NFWE	3N~ 400V 50Hz	Without DHW tank heater	-
		With DHW tank heater	0.41
RWH-5.0NFWE		Without DHW tank heater	-
		With DHW tank heater	0.41
RWH-6.0NFWE		Without DHW tank heater	-
		With DHW tank heater	0.41

NOTE

The data corresponding to DHW tank heater is calculated in combination with the YUTAKI S80 domestic hot water tank accessory "DHWS(200/260)S-2.7H2E(-W)".

◆ Monobloc system - YUTAKI M

Model	Power supply	Operation mode	Z_{max} (Ω)
RASM-3VNE	1~ 230V 50Hz	-	0.35
		With DHW tank heater	0.22
RASM-4VNE		-	0.24
		With DHW tank heater	0.17
RASM-5VNE		-	0.24
		With DHW tank heater	0.17
RASM-6VNE		-	0.24
		With DHW tank heater	0.17
RASM-4NE	3N~ 400V 50Hz	-	-
		With DHW tank heater	0.31
RASM-5NE		-	-
		With DHW tank heater	0.31
RASM-6NE		-	-
		With DHW tank heater	0.30

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".

- The status of Harmonics for each model, regarding compliance with IEC 61000-3-2 and IEC 61000-3-12, is as follows:

Status regarding compliance with IEC 61000-3-2 and IEC 61000-3-12	Models				
	Split system				Monobloc system
	Outdoor unit	Indoor unit			YUTAKI M
		YUTAKI S	YUTAKI S COMBI	YUTAKI S80	
Equipment complying with IEC 61000-3-2 (*): Professional use	RAS-2WHVNP RAS-2.5WHVNP RAS-3WHVNP RAS-4WHNPE (*) RAS-5WHNPE (*) RAS-6WHNPE (*)	RWM-2.0NE(-W) RWM-2.5NE(-W) RWM-3.0NE(-W) RWM-4.0NE(-W) (3N~) RWM-5.0NE(-W) (3N~) RWM-6.0NE(-W) (3N~) RWM-8.0NE(-W) RWM-10.0NE(-W)	-	RWH-4.0NFE RWH-5.0NFE RWH-6.0NFE	RASM-4NE RASM-5NE RASM-6NE
Equipment complying with IEC 61000-3-12	RAS-4WHVNPE RAS-5WHVNPE RAS-6WHVNPE	RWM-4.0NE(-W) (1~) RWM-5.0NE(-W) (1~) RWM-6.0NE(-W) (1~)	RWD-2.0NWE-200S(-W) RWD-2.0NW(S)E-260S(-W) RWD-2.5NWE-200S(-W) RWD-2.5NW(S)E-260S(-W) RWD-3.0NWE-200S(-W) RWD-3.0NW(S)E-260S(-W) RWD-4.0NWE-260S(-W) RWD-4.0NW(S)E-260S(-W) RWD-5.0NWE-260S(-W) RWD-5.0NW(S)E-260S(-W) RWD-6.0NWE-260S(-W) RWD-6.0NW(S)E-260S(-W)	RWH-4.0VNFE RWH-5.0VNFE RWH-6.0VNFE RWH-4.0VNFWE RWH-5.0VNFWE RWH-6.0VNFWE RWH-4.0NFWE RWH-5.0NFWE RWH-6.0NFWE	RASM-3VNE RASM-4VNE RASM-5VNE RASM-6VNE
Installation restrictions may be applied by supply authorities in relation to harmonics	RAS-8WHNPE RAS-10WHNPE	-	-	-	-

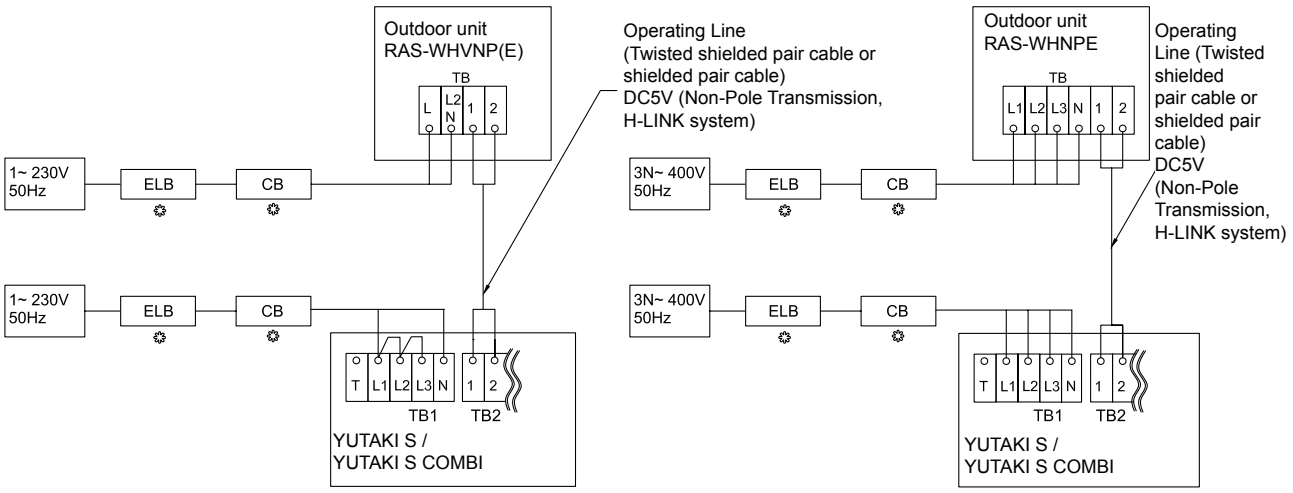
- Check to ensure that existing installation (mains power switches, circuit breakers, wires, connectors and wire terminals) already complies with the national and local regulations.
- The use of the DHW tank heater is disabled as factory setting. If it is desired to enable the DHW tank heater operation during normal indoor unit operation, adjust the DSW4 pin 3 of the PCB1 to the ON position and use the adequate protections. Refer to the section *"10.3 Electrical connection"* for the detailed information.

10.2 System wiring diagram

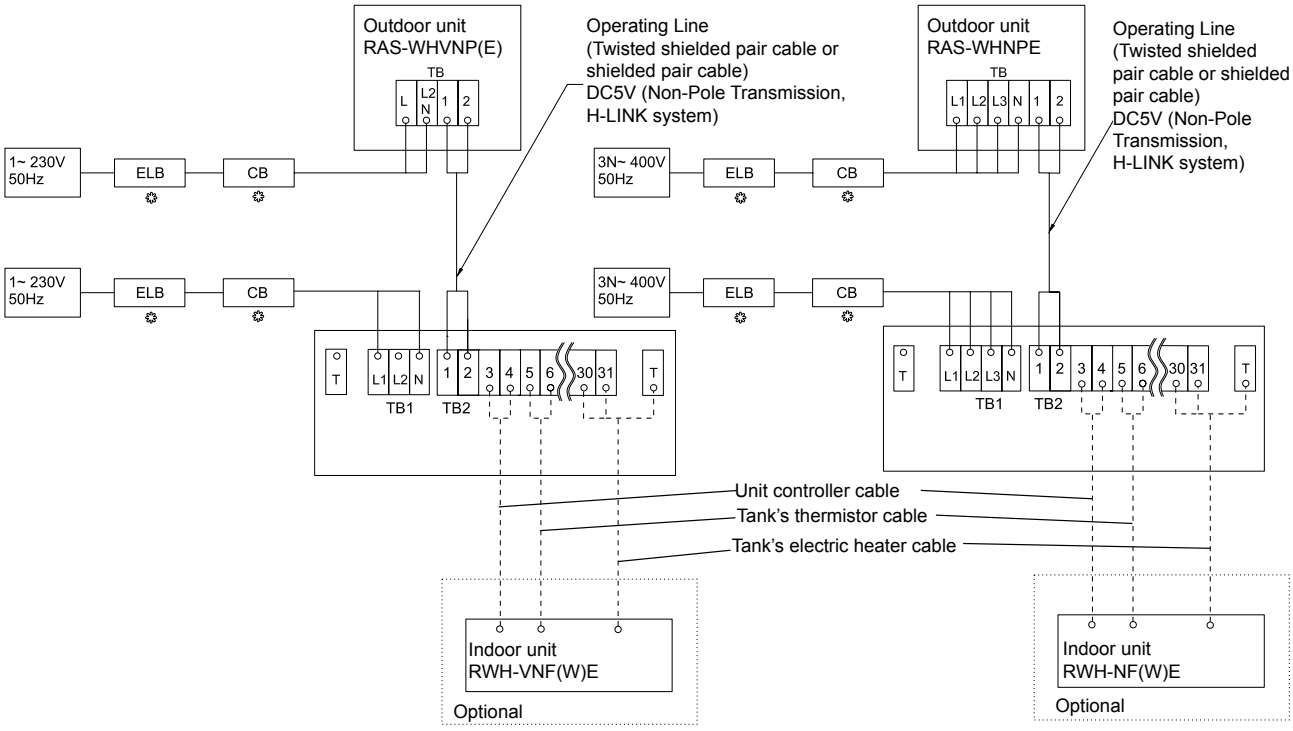
Connect the units according to the following electric diagram:

TB	:	Terminal board	——	:	Field wiring
CB	:	Circuit breaker	❁	:	Field-supplied
ELB	:	Earth leakage breaker	1,2	:	Outdoor-Indoor communication
- - -	:	Internal wiring			

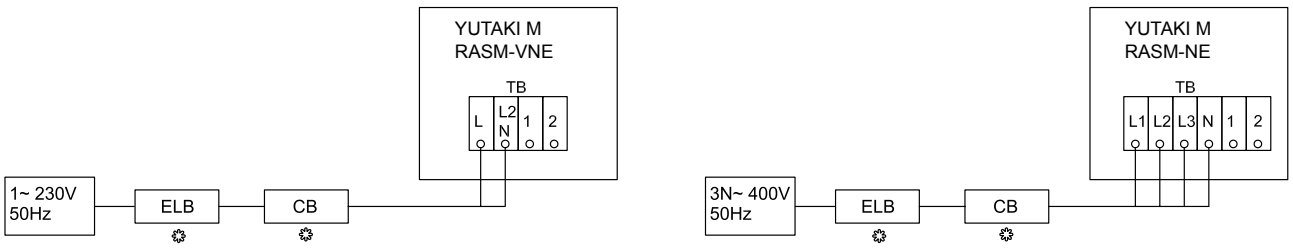
YUTAKI (S / S COMBI)



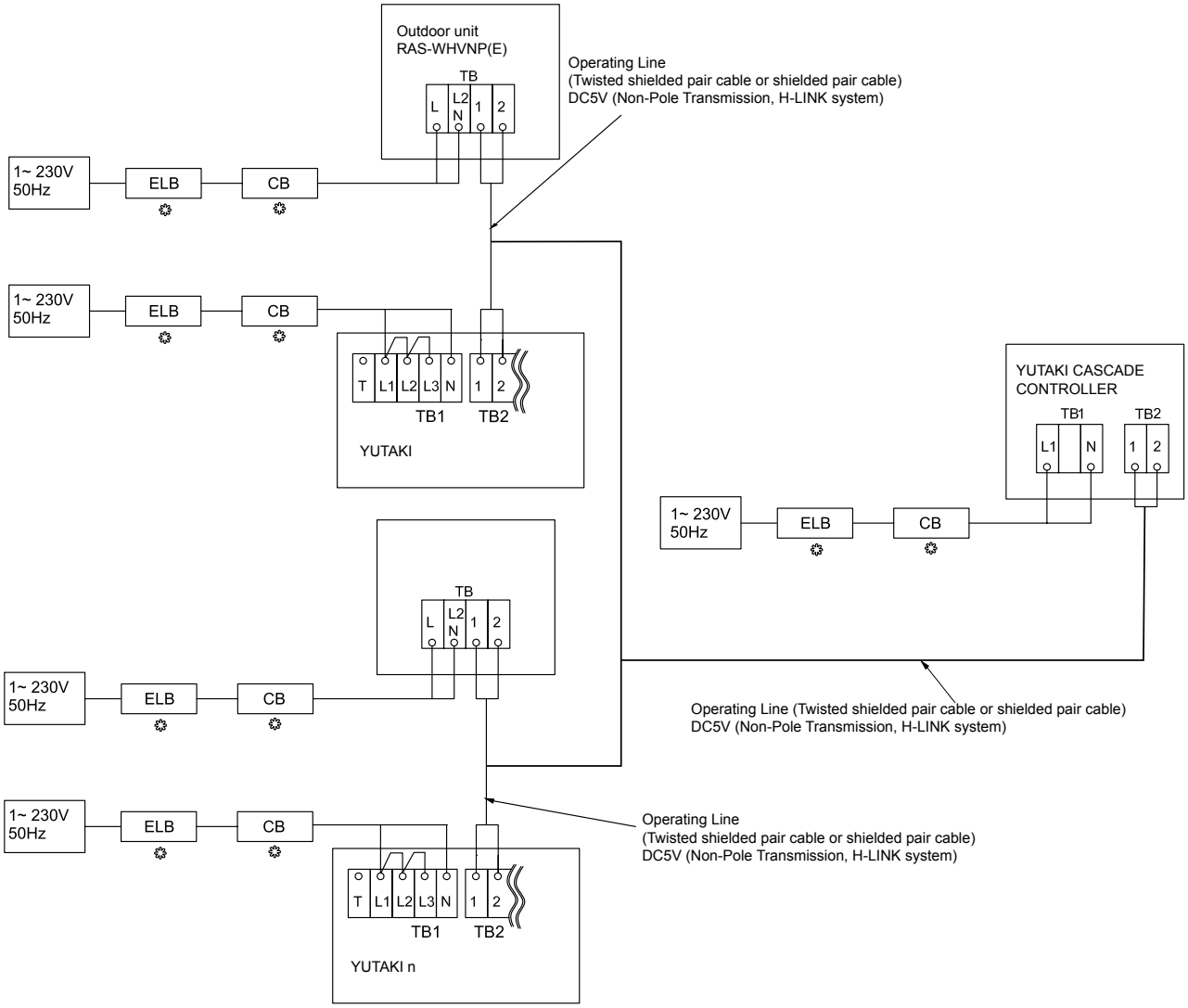
YUTAKI S80



YUTAKI M



◆ YUTAKI CASCADE CONTROLLER



10.3 Electrical connection

⚠ CAUTION

- *Check to ensure that the field supplied electrical components (mains power switches, circuit breakers, wires, connectors and wire terminals) have been properly selected according to the electrical data indicated on this chapter and they comply with national and local codes. If it is necessary, contact with your local authority in regards to standards, rules, regulations, etc.*
- *Use a dedicated power circuit for the indoor unit. Do not use a power circuit shared with the outdoor unit or any other appliance.*

10.3.1 Wiring size

Use wires which are not lighter than the polychloroprene sheathed flexible cord (code designation 60245 IEC 57).

◆ **Split system - Outdoor unit**

Model	Power supply	Max. current (A)	Power supply cables	Transmitting cables	Actuator cables
			EN60335-1	EN60335-1	EN60335-1
RAS-2WHVNP	1~ 230V 50Hz	13.8	2 x 2.5 mm² + GND	2 x 0.75 mm² (*Shielded cable)	2 x 0.75 mm² + GND
RAS-2.5WHVNP		15.8	2 x 4.0 mm² + GND		
RAS-3WHVNP		17.8	2 x 4.0 mm² + GND		
RAS-4WHVNPE		30.5	2 x 10.0 mm² + GND		
RAS-5WHVNPE		30.5	2 x 10.0 mm² + GND		
RAS-6WHVNPE		30.5	2 x 10.0 mm² + GND		
RAS-4WHNPE	3N~ 400V 50Hz	14.0	4 x 4.0 mm² + GND		
RAS-5WHNPE		14.0	4 x 4.0 mm² + GND		
RAS-6WHNPE		16.0	4 x 4.0 mm² + GND		
RAS-8WHNPE		24.0	4 x 6.0 mm² + GND		
RAS-10WHNPE		24.0	4 x 6.0 mm² + GND		

◆ **Split system - Indoor unit**

YUTAKI S

Model	Power supply	Operation mode	Max. current (A)	Power supply cables	Transmitting cables	Actuator cables
				EN60335-1	EN60335-1	EN60335-1
RWM-(2.0-3.0) NE(-W)	1~ 230V 50Hz	Without electric heaters	0.2	2 x 1.5 mm² + GND	2 x 0.75 mm²	2 x 0.75mm² + GND
		With electric heater	15.3	2 x 2.5 mm² + GND		
		With DHW tank heater	15.3	2 x 2.5 mm² + GND		
		With electric and DHW tank heaters	30.3	2 x 6.0 mm² + GND		
RWM-(4.0-6.0) NE(-W)	1~ 230V 50Hz	Without electric heaters	0.3	2 x 1.5 mm² + GND		
		With electric heater	30.5	2 x 6.0 mm² + GND		
		With DHW tank heater	15.4	2 x 2.5 mm² + GND		
		With electric and DHW tank heaters	45.5	2 x 10.0 mm² + GND		
	3N~ 400V 50Hz	Without electric heaters	0.3	4 x 1.5 mm² + GND		
		With electric heater	10.3	4 x 2.5 mm² + GND		
		With DHW tank heater	15.4	4 x 4.0 mm² + GND		
		With electric and DHW tank heaters	25.4	4 x 6.0 mm² + GND		
RWM-(8.0/10.0) NE(-W)	3N~ 400V 50Hz	Without electric heaters	0.3	4 x 1.5 mm² + GND		
		With electric heater	15.3	4 x 4.0 mm² + GND		
		With DHW tank heater	15.4	4 x 4.0 mm² + GND		
		With electric and DHW tank heaters	30.4	4 x 10.0 mm² + GND		

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".

YUTAKI S COMBI

Model	Power supply	Operation mode	Max. current (A)	Power supply cables	Transmitting cables	Actuator cables
				EN60335-1	EN60335-1	EN60335-1
RWD-(2.0-3.0) NW(S)E-(200/260) S(-K)(-W)	1~230V 50Hz	Without electric heaters	0.2	2 x 1.5 mm² + GND	2 x 0.75 mm²	2 x 0.75 mm² + GND
		With electric heater	15.3	2 x 2.5 mm² + GND		
		With DHW tank heater	14.5	2 x 2.5 mm² + GND		
		With electric and DHW tank heaters	29.6	2 x 6.0 mm² + GND		
RWD-(4.0-6.0) NW(S)E-(200/260) S(-K)(-W)	1~230V 50Hz	Without electric heaters	0.3	2 x 1.5 mm² + GND		
		With electric heater	30.5	2 x 6.0 mm² + GND		
		With DHW tank heater	14.7	2 x 2.5 mm² + GND		
		With electric and DHW tank heaters	44.8	2 x 10.0 mm² + GND		
	3N~400V 50Hz	Without electric heaters	0.3	4 x 1.5 mm² + GND		
		With electric heater	10.3	4 x 2.5 mm² + GND		
		With DHW tank heater	14.7	4 x 4.0 mm² + GND		
		With electric and DHW tank heaters	24.7	4 x 6.0 mm² + GND		

YUTAKI S80

Indoor unit alone

Model	Power supply	Operation mode	Max. current (A)	Power supply cables	Transmitting cables	Actuator cables
				EN60335-1	EN60335-1	EN60335-1
RWH-4.0VNFE	1~ 230V 50Hz	Without DHW tank heater	24.0	2 x 6.0 mm² + GND	2 x 0.75 mm²	2 x 0.75 mm² + GND
		With DHW tank heater	38.0	2 x 10.0 mm² + GND		
RWH-5.0VNFE		Without DHW tank heater	28.0	2 x 6.0 mm² + GND		
		With DHW tank heater	42.0	2 x 10.0 mm² + GND		
RWH-6.0VNFE		Without DHW tank heater	31.0	2 x 6.0 mm² + GND		
		With DHW tank heater	45.0	2 x 10.0 mm² + GND		
RWH-4.0NFE	3N~ 400V 50Hz	Without DHW tank heater	10.0	4 x 2.5 mm² + GND		
		With DHW tank heater	24.0	4 x 4.0 mm² + GND		
RWH-5.0NFE		Without DHW tank heater	10.0	4 x 2.5 mm² + GND		
		With DHW tank heater	24.0	4 x 4.0 mm² + GND		
RWH-6.0NFE		Without DHW tank heater	10.0	4 x 2.5 mm² + GND		
		With DHW tank heater	24.0	4 x 4.0 mm² + GND		

Indoor unit in combination with DHW tank

Model	Power supply	Operation mode	Max. current (A)	Power supply cables	Transmitting cables	Actuator cables
				EN60335-1	EN60335-1	EN60335-1
RWH-4.0VNFWE	1~ 230V 50Hz	Without DHW tank heater	24.0	2 x 6.0 mm² + GND	2 x 0.75 mm²	2 x 0.75 mm² + GND
		With DHW tank heater	36.0	2 x 10.0 mm² + GND		
RWH-5.0VNFWE		Without DHW tank heater	27.0	2 x 6.0 mm² + GND		
		With DHW tank heater	40.0	2 x 10.0 mm² + GND		
RWH-6.0VNFWE		Without DHW tank heater	31.0	2 x 10.0 mm² + GND		
		With DHW tank heater	43.0	2 x 10.0 mm² + GND		
RWH-4.0NFWE	3N~ 400V 50Hz	Without DHW tank heater	10.0	4 x 4.0 mm² + GND		
		With DHW tank heater	22.0	4 x 10.0 mm² + GND		
RWH-5.0NFWE		Without DHW tank heater	10.0	4 x 4.0 mm² + GND		
		With DHW tank heater	22.0	4 x 10.0 mm² + GND		
RWH-6.0NFWE		Without DHW tank heater	10.0	4 x 4.0 mm² + GND		
		With DHW tank heater	22.0	4 x 10.0 mm² + GND		

NOTE

The data corresponding to DHW tank heater is calculated in combination with the YUTAKI S80 domestic hot water tank accessory "DHWS(200/260)S-2.7H2E(-W)".

◆ Monobloc system - YUTAKI M

Model	Power supply	Operation mode	Max. current (A)	Power supply cables	Transmitting cables	Actuator cables
				EN60335-1	EN60335-1	EN60335-1
RASM-3VNE	1~ 230V 50Hz	Without DHW tank heater	21.6	2 x 6.0 mm² + GND	2 x 0.75 mm²	2 x 0.75 mm² + GND
		With DHW tank heater	34.1	2 x 10.0 mm² + GND		
RASM-4VNE		Without DHW tank heater	30.8	2 x 6.0 mm² + GND		
		With DHW tank heater	43.3	2 x 10.0 mm² + GND		
RASM-5VNE		Without DHW tank heater	30.8	2 x 6.0 mm² + GND		
		With DHW tank heater	43.3	2 x 10.0 mm² + GND		
RASM-6VNE		Without DHW tank heater	30.8	2 x 6.0 mm² + GND		
		With DHW tank heater	43.3	2 x 10.0 mm² + GND		
RASM-4NE	3N~ 400V 50Hz	Without DHW tank heater	14.3	4 x 4.0 mm² + GND		
		With DHW tank heater	26.8	4 x 6.0 mm² + GND		
RASM-5NE		Without DHW tank heater	14.3	4 x 4.0 mm² + GND		
		With DHW tank heater	26.8	4 x 6.0 mm² + GND		
RASM-6NE		Without DHW tank heater	16.3	4 x 6.0 mm² + GND		
		With DHW tank heater	28.8	4 x 10.0 mm² + GND		

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".

10.3.2 Minimum requirements of the protection devices

⚠ CAUTION

- *Ensure specifically that there is an Earth Leakage Breaker (ELB) installed for the units (outdoor and indoor unit).*
- *If the installation is already equipped with an Earth Leakage Breaker (ELB), ensure that its rated current is large enough to hold the current of the units (outdoor and indoor unit).*

NOTE

- *Electric fuses can be used instead of magnetic Circuit Breakers (CB). In that case, select fuses with similar rated values as the CB.*
- *The Earth Leakage Breaker (ELB) mentioned on this manual is also commonly known as Residual Current Device (RCD) or Residual Current Circuit Breaker (RCCB).*
- *The Circuit Breakers (CB) are also known as Thermal-Magnetic Circuit Breakers or just Magnetic Circuit Breakers (MCB).*

◆ Split system - Outdoor unit

Model	Power supply	Applicable voltage		MC (A)	CB (A)	ELB (nº of poles/A/mA)
		U max. (V)	U min. (V)			
RAS-2WHVNP	1~ 230V 50Hz	253	207	13.8	16	2/40/30
RAS-2.5WHVNP				15.8	16	
RAS-3WHVNP				17.8	20	
RAS-4WHVNPE				30.5	32	
RAS-5WHVNPE				30.5	32	
RAS-6WHVNPE				30.5	32	
RAS-4WHNPE	3N~ 400V 50Hz	440	360	14.0	15	4/40/30
RAS-5WHNPE				14.0	15	
RAS-6WHNPE				16.0	20	
RAS-8WHNPE				24.0	25	
RAS-10WHNPE				24.0	25	

MC: Maximum current; CB: Circuit breaker; ELB: Earth leakage breaker

◆ Split system - Indoor unit

YUTAKI S

Model	Power supply	Applicable voltage		Operation mode	MC (A)	CB (A)	ELB (nº of poles/A/mA)
		U max. (V)	U min. (V)				
RWM-(2.0-3.0) NE(-W)	1~ 230V 50Hz	253	207	Without electric heaters	0.2	5	2/40/30
				With electric heater	15.3	16	
				With DHW tank heater	15.3	16	
				With electric and DHW tank heaters	30.3	32	
RWM-(4.0-6.0) NE(-W)	1~ 230V 50Hz	253	207	Without electric heaters	0.3	5	2/40/30
				With electric heater	30.5	32	
				With DHW tank heater	15.4	16	
				With electric and DHW tank heaters	45.5	63	2/63/30
	3N~ 400V 50Hz	440	360	Without electric heaters	0.3	5	4/40/30
				With electric heater	10.3	15	
				With DHW tank heater	15.4	20	
				With electric and DHW tank heaters	25.4	30	
RWM-(8.0/10.0) NE(-W)	3N~ 400V 50Hz	440	360	Without electric heaters	0.3	5	4/40/30
				With electric heater	15.3	20	
				With DHW tank heater	15.4	20	
				With electric and DHW tank heaters	30.4	40	

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".

YUTAKI S COMBI

Model	Power supply	Applicable voltage		Operation mode	MC (A)	CB (A)	ELB (nº of poles/A/mA)
		U max. (V)	U min. (V)				
RWD-(2.0-3.0) NW(S)E-(200/260)S(-K) (-W)	1~ 230V 50Hz	253	207	Without electric heaters	0.2	5	2/40/30
				With electric heater	15.3	16	
				With DHW tank heater	14.5	16	
				With electric and DHW tank heaters	29.6	32	
RWD-(4.0-6.0) NW(S)E-(200/260)S(-K) (-W)	1~ 230V 50Hz	253	207	Without electric heaters	0.3	5	2/40/30
				With electric heater	30.5	32	
				With DHW tank heater	14.7	16	
				With electric and DHW tank heaters	44.8	63	2/63/30
	3N~ 400V 50Hz	440	360	Without electric heaters	0.3	5	4/40/30
				With electric heater	10.3	15	
				With DHW tank heater	14.7	20	
				With electric and DHW tank heaters	24.7	30	

YUTAKI S80

Version for indoor unit alone

Model	Power supply	Applicable voltage		Operation mode	MC (A)	CB (A)	ELB (nº of poles/A/mA)
		U max. (V)	U min. (V)				
RWH-4.0VNFE	1~ 230V 50Hz	253	207	Without DHW tank heater	24.0	32.0	2/40/30
				With DHW tank heater	38.0	40.0	
RWH-5.0VNFE				Without DHW tank heater	28.0	32.0	
				With DHW tank heater	42.0	50.0	2/63/30
RWH-6.0VNFE				Without DHW tank heater	31.0	32.0	2/40/30
				With DHW tank heater	45.0	50.0	2/63/30
RWH-4.0NFE	3N~ 400V 50Hz	440	360	Without DHW tank heater	10.0	15.0	4/40/30
				With DHW tank heater	24.0	25.0	
RWH-5.0NFE				Without DHW tank heater	10.0	15.0	
				With DHW tank heater	24.0	25.0	
RWH-6.0NFE				Without DHW tank heater	10.0	15.0	
				With DHW tank heater	24.0	25.0	

Version for combination with DHW tank

Model	Power supply	Applicable voltage		Operation mode	MC (A)	CB (A)	ELB (nº of poles/A/mA)
		U max. (V)	U min. (V)				
RWH-4.0VNFWE	1~ 230V 50Hz	253	207	Without DHW tank heater	24.0	32.0	2/40/30
				With DHW tank heater	36.0	40.0	
RWH-5.0VNFWE				Without DHW tank heater	27.0	32.0	
				With DHW tank heater	40.0	50.0	2/63/30
RWH-6.0VNFWE				Without DHW tank heater	31.0	32.0	2/40/30
				With DHW tank heater	43.0	50.0	2/63/30
RWH-4.0NFWE	3N~ 400V 50Hz	440	360	Without DHW tank heater	10.0	15.0	4/40/30
				With DHW tank heater	22.0	25.0	
RWH-5.0NFWE				Without DHW tank heater	10.0	15.0	
				With DHW tank heater	22.0	25.0	
RWH-6.0NFWE				Without DHW tank heater	10.0	15.0	
				With DHW tank heater	22.0	25.0	

NOTE

The data corresponding to DHW tank heater is calculated in combination with the YUTAKI S80 domestic hot water tank accessory "DHWS(200/260)S-2.7H2E(-W)".

◆ Monobloc system - YUTAKI M

Model	Power supply	Applicable voltage		Operation mode	MC (A)	CB (A)	ELB (nº of poles/A/mA)
		U max. (V)	U min. (V)				
RASM-3VNE	1~ 230V 50Hz	253	207	Without DHW tank heater	18.0	20	2/40/30
				With DHW tank heater	33.0	40	
RASM-4VNE				Without DHW tank heater	30.8	32	
				With DHW tank heater	45.8	63	2/63/30
RASM-5VNE				Without DHW tank heater	30.8	32	2/40/30
				With DHW tank heater	45.8	63	2/63/30
RASM-6VNE				Without DHW tank heater	30.8	32	2/40/30
				With DHW tank heater	45.8	63	2/63/30
RASM-4NE	3N~ 400V 50Hz	440	360	Without DHW tank heater	14.3	20	4/40/30
				With DHW tank heater	29.3	40	
RASM-5NE				Without DHW tank heater	14.3	20	
				With DHW tank heater	29.3	40	
RASM-6NE				Without DHW tank heater	24.3	20	
				With DHW tank heater	39.4	63	4/63/30

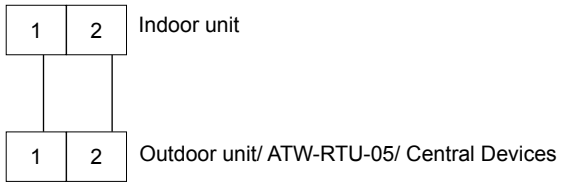
NOTE

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

10.4 Transmission wiring

10.4.1 YUTAKI units

- This is the transmission wiring between outdoor and indoor unit, ATW-RTU-05 communication and Central devices.
- The transmission is wired to terminals 1-2.
- The H-LINK II wiring system requires only two transmission cables that connect the indoor unit and the outdoor unit in case of split system and also connect the indoor unit with ATW-RTU-05 or central devices like ATW-TAG-02, ATW-KNX-02 and ATW-MBS-02.



- Use twist pair wires (0.75 mm²) for operation wiring between outdoor unit and indoor unit. The wiring must consist of 2-core wires (Do not use wire with more than 3 cores).
- Use shielded wires for intermediate wiring to protect the units from noise interference, with a length of less than 300m and a size in compliance with local codes.
- In the event that a conduit tube for field-wiring is not used, fix rubber bushes to the panel with adhesive.

CAUTION

Ensure that the transmission wiring is not wrongly connected to any live part that could be damaged the PCB.

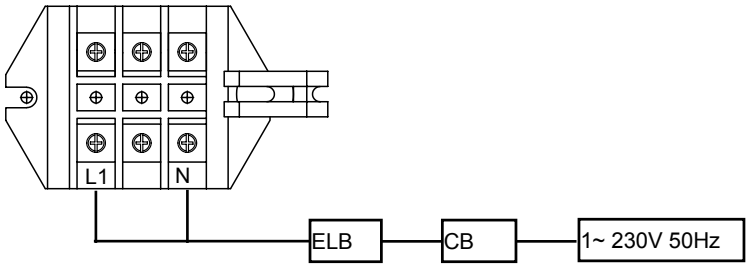
NOTE

This section applies only to split systems (Outdoor unit + Indoor unit). It does not apply to YUTAKI M.

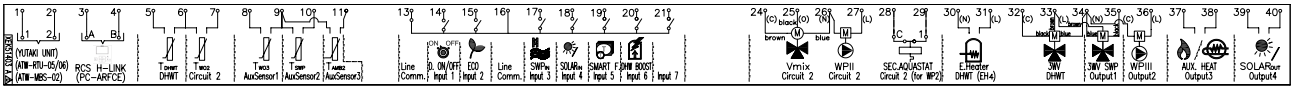
10.4.2 YUTAKI CASCADE CONTROLLER

10.4.3 Connections on the Terminal board 1 (TB1)

The followings connections on the Terminal board 1 of the YUTAKI CASCADE CONTROLLER are required:



10.4.4 Connections on the Terminal board 2 (TB2)

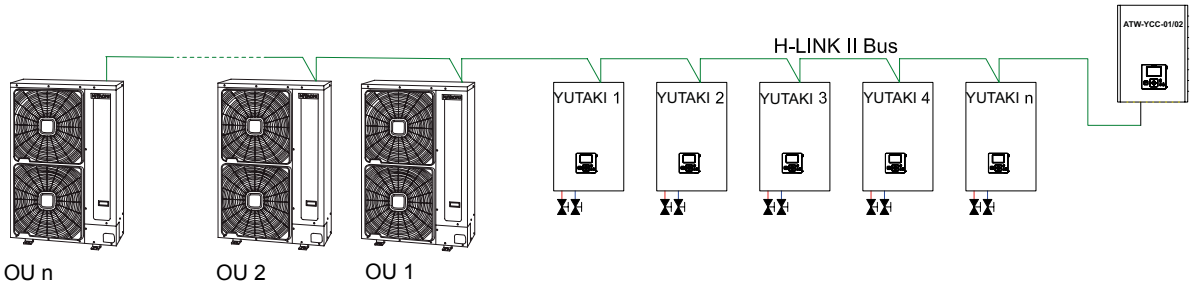


⚠ CAUTION

When installing the YUTAKI CASCADE CONTROLLER (ATW-YCC-(01/02)) electrical connections for the control of the system must be done on the terminal board 2 of the YUTAKI CASCADE CONTROLLER rather than perform those connections on the terminal board of the YUTAKI.

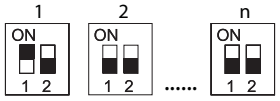
◆ H-LINK connection

The YUTAKI units, YUTAKI CASCADE CONTROLLER and outdoor units are interconnected via bus called H-LINK II, consisting of 2 non-polarity cables and accepting lengths of up to 1000 m. All YUTAKI and Outdoor units which are controlled by the same YUTAKI CASCADE CONTROLLER unit must be connected at the same H-LINK II line:

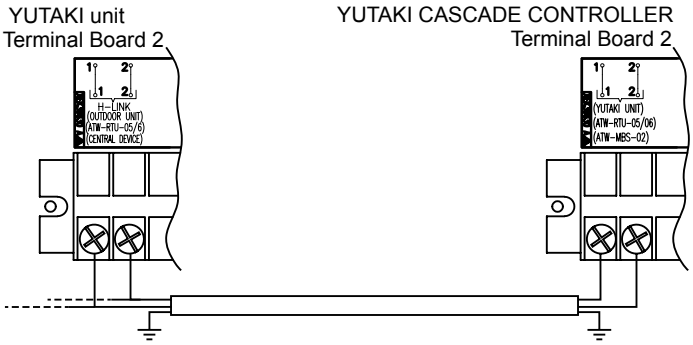


Setting of End Terminal Resistance

When connecting outdoor units to an H-LINK II line, it is necessary to set the end terminal resistance as active (DSW5-1 ON) in only one of the units. Pin 1 of DSW5 is factory set to ON in all the outdoor units. Therefore, when connecting multiple outdoor units to an H-LINK II line, please check and make sure that only one of the units has pin 1 of DSW5 set to ON, and the rest of the units have pin 1 of DSW5 set to OFF.



The H-LINK II connection must be done as it is shown in the figure below:



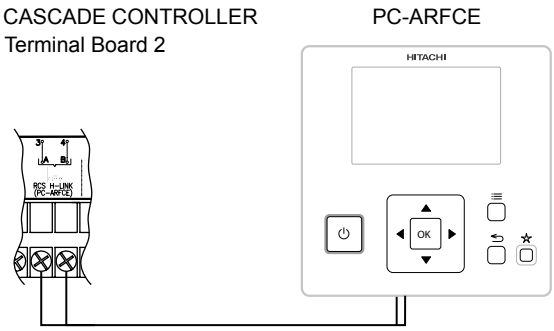
- The H-LINK wiring system requires only two transmission cables that connect the indoor unit and the outdoor unit.
- Use twist pair wires (0.75 mm²) for operation wiring between outdoor unit and indoor unit. The wiring must consist of 2-core wires (Do not use wire with more than 3 cores).
- Use shielded wires for intermediate wiring to protect the units from noise interference. Total H-LINK circuit length shall not exceed 1000m and a size in compliance with local codes.
- In the event that a conduit tube for field-wiring is not used, fix rubber bushes to the panel with adhesive.

⚠ CAUTION

Ensure that the transmission wiring is not wrongly connected to any live part that could be damaged the PCB.

◆ LCD unit controller (PC-ARFCE) connection

Connection for the LCD unit controller PC-ARFCE should be done on the Terminal Board 2 of the YUTAKI CASCADE CONTROLLER as shown in the next figure:



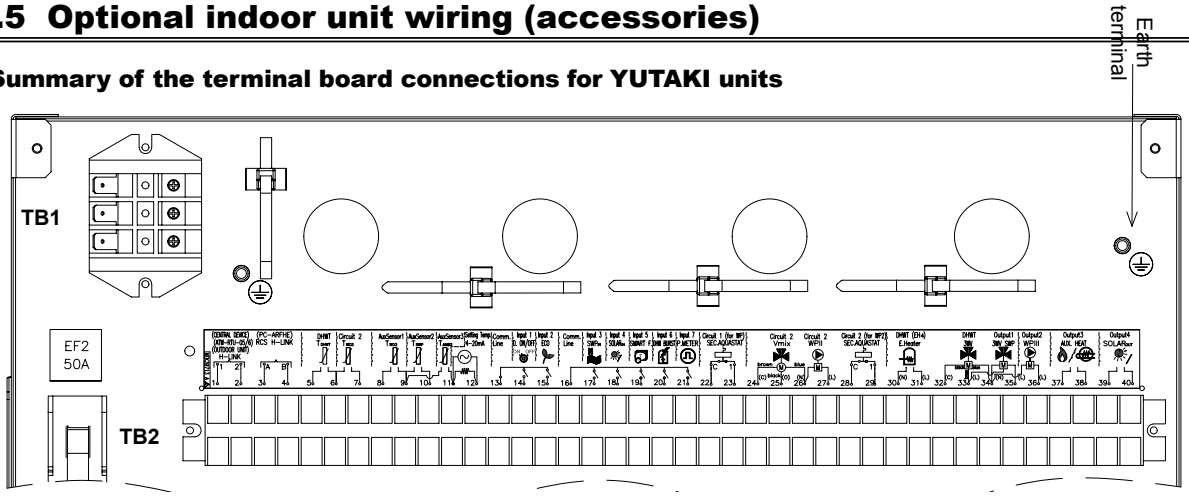
For this purpose, a H-LINK cable (accessory) is necessary.

The torque for the tightening of the screws of each Terminal board is explained in the table below

Terminal board	Tightening Torque (Nm/cm²)
TB1	2.0~2.5
TB2	1.0~1.3

10.5 Optional indoor unit wiring (accessories)

◆ Summary of the terminal board connections for YUTAKI units



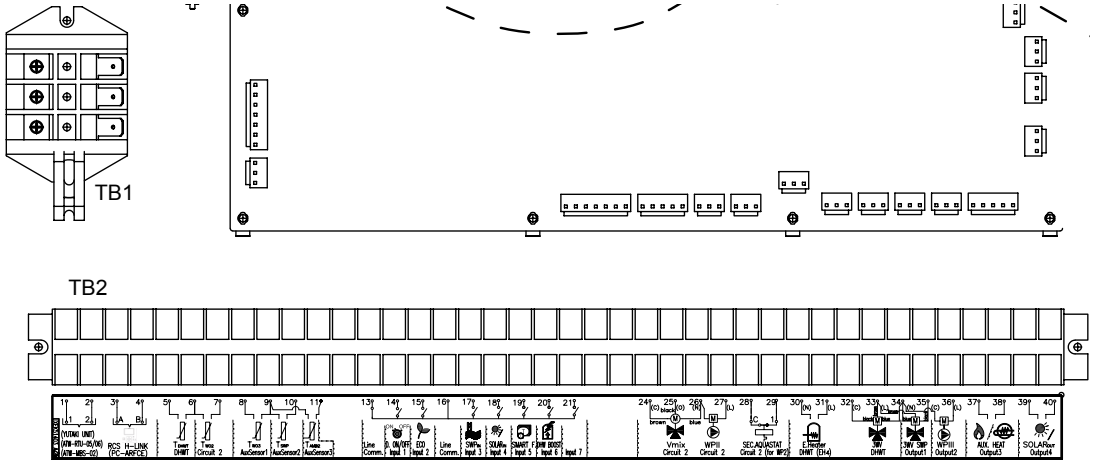
Mark	Part name		Description
TERMINAL BOARD 1 (TB1)			
N	1~ 230V 50Hz	3N~ 400 50Hz	Main power supply connection
L1			
L2	-		
L3			
TERMINAL BOARD 2 (TB2)			
1	H-LINK commutation		The H-LINK transmission has to be done between the indoor unit and the terminals 1-2 of either outdoor unit, ATW-RTU-05 or any other central device.
2			
3	H-LINK communication for remote control switch		PC-ARFHE
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 after hydraulic separator (As default: Aux Sensor 1)		Water sensor for hydraulic separator, buffer tank or boiler combination
9	Common thermistor		Common terminal for thermistors
10	Thermistor for swimming pool water temperature (As default: Aux Sensor 2)		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 (As default: Aux Sensor 3)		The sensor is used for the second ambient temperature control and it should be positioned outdoors
11	4-20 mA application		HSW (Heating Setting Water) and CSW (Cooling Setting Water) operation can be overridden by external controller using 4~20mA input (CN5). In order to allow override operation a DSW setting must be done, otherwise values selected by 7-segments will be used. When override operation is allowed, external controller decides the target temperature by inputting a 4~20mA value current in CN5. This connector will transform input current to voltage by means of a grounded 240Ω resistor connected into a terminal board. Unit will convert read voltage to setting temperature proportionately.
12			
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 split air to water heat pump system ON and OFF.
15	Input 2 (ECO mode) (*)		Available signal which allows to reduce the water temperature setting 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.
18	Input 4 (Solar) (*)		Available input for Solar combination with Domestic Hot Water Tank

Mark	Part name	Description
19	Input 5 (Smart function) (*)	This function allows an external tariff switch device to switch OFF the heat pump and/ or the DHW during peak electricity demand period. Depending on the setting, the heat pump and/ or DHW become blocked or only is switched ON the DHW 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 (WP1)	Terminals intended for the connection of the Aquastat security accessory (ATW-AQT-01) to control the water temperature of the circuit 1. Terminals for the connection of the limit thermostat (only for UK market models).
23	Limit thermostat(Only UK market models)	
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)	N Common	
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	Aquastat security for circuit 2 (WP2)	Terminals intended for the connection of the Aquastat security accessory (ATW-AQT-01) to control the water temperature of the circuit 2.
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)	Common line	Common terminal for the 3-way valve for DHW tank
33(L)	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.
34(N)	N common	Neutral terminal common for 3-way valve of DHW tank and outputs 1 and 2.
35(L)	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. A water electric heater (as accessory) can be used to provide the additional heating required on the coldest days of the year.
38		
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.

◆ Summary of the terminal board connections for YUTAKI CASCADE CONTROLLER



Mark	Part name	Description
		TERMINAL BOARD 2 (TB2)
1	Communication	Communication between the CASCADE CONTROLLER and terminals 1-2 of the YUTAKI unit, and additionally ATW-RTU-05/06 (for temperature control) and/or ATW-MBS-02 (only for system monitoring).
2		
3	H-LINK communication for Remote control switch	Terminals for the connection of the LCD unit controller (PC-ARFCE) and Wired Room Thermostat (PC-ARFHE-01/02).
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 after hydraulic separator (THM_{AUX1})	Water sensor for hydraulic separator, buffer tank or boiler combination.
9	Common thermistor	Common terminal for thermistors.
10	Thermistor for swimming pool water temperature (THM_{AUX2})	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 (THM_{AUX3})	The sensor is used for the second ambient temperature control and it should be positioned outdoors.
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 split 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.
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	Vacant for to be configured and used
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)	N Common	
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	Aquastat security for circuit 2 (WP2)	Terminals intended for the connection of the Aquastat security accessory (ATW-AQT-01) for controlling water temperature of the circuit 2.
29		

Mark	Part name	Description
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)	Common line	Common terminal for the 3-way valve for DHW tank.
33(L)	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.
34(N)	N common	Neutral terminal common for 3-way valve of DHW tank and outputs 1 and 2.
35(L)	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. A water electric heater (as accessory) can be used to provide the additional heating required on the coldest days of the year.
38		
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. Refer to the YUTAKI CASCADE CONTROLLER and the PC-ARFCE technical documentation and operation manual for detailed information.

10.6 Setting of DIP switches and RSW switches

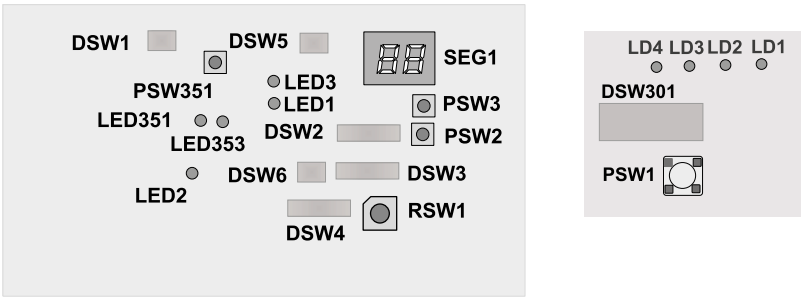
10.6.1 Outdoor unit

10.6.1.1 Location of DIP switches and rotary switches

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

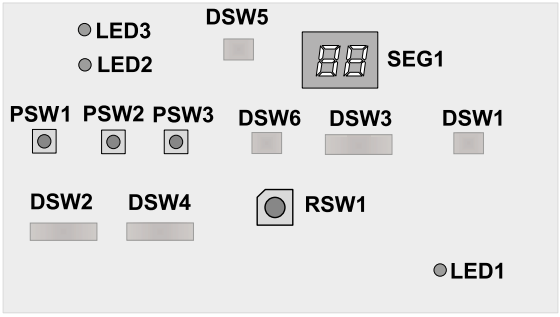
RAS-(2/2.5/3)WHVNP

PCB1



RAS-(4-10)WH(V)NPE and PCB1 for YUTAKI M (RASM-(3-6)(V)NE)

PCB



NOTE

DIP-IPM or PCB2 (depending on model) has a DSW1. When pin number 1 is set to ON position, the electrical current detections is cancelled. Pin number 1 should be to OFF position after electrical work.

10.6.1.2 Function of DIP switches and rotary switches

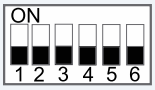
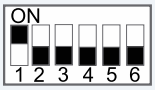
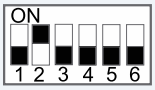
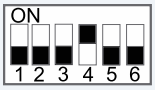
NOTE

- *The mark "■" indicates the position of dips switches.*
- *No mark "■" indicates pin position is not affecting.*
- *The figures show the settings before shipment or after selection.*

DANGER

Before setting dips switches, first turn the power source off and then set the position of the dips switches. In case of setting the switches without turning the power source off, the contents of the setting are invalid.

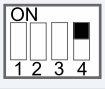
◆ DSW301 (Only RAS-(2/2.5/3)WHVNP): Test run mode

Setting before shipment	
Test run for pump down	
Test run for heating	
Forced stoppage of compressor	

◆ DSW1 (Only RAS-(2/2.5/3)WHVNP): No setting is required

When set pin number 1 to ON, the electric current detection is cancelled. Pin number 1 should be set back to OFF after electrical work	

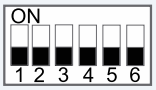
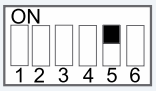
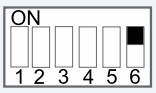
◆ DSW1 (RAS-(4-10)WH(V)NPE) and PCB1 for YUTAKI M (RASM-(3-6)(V)NE): For Test run

Factory setting	
Test run for pump down	
Test run for heating	
Test run for cooling intermediate season (Not used)	
Test run for heating for intermediate season (Not used)	
Forced stoppage of compressor	

NOTE

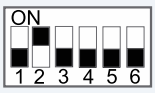
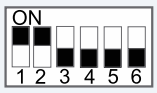
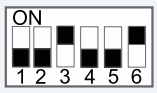
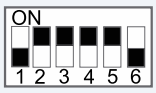
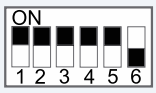
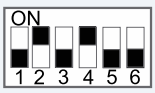
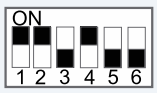
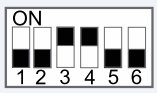
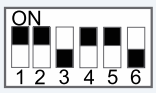
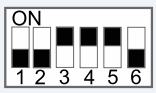
- *This operation is reset once the compressor is in Thermo-ON mode.*
- *During the test run operation the units will operate continuously during 2 hours without Thermo-OFF and the 3-minute guard for compressor protection will be effective.*
- *Test run will start within 20 seconds after setting DSW1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

◆ DSW2: selection function

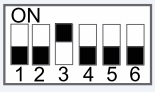
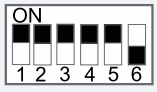
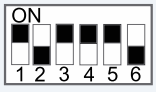
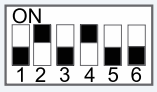
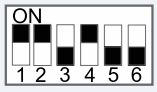
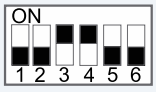
Setting before shipment	
Optional function setting mode (The optional function selection mode becomes available)	
External output setting mode (The output signals selection mode becomes available).	

◆ DSW3: Capacity setting (No setting is required)

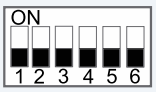
Outdoor unit RAS-(2-10)WH(V)NPE Factory setting

RAS-2WHVNP	RAS-2.5WHVNP	RAS-3WHVNP	RAS-4WHVNPE	RAS-5WHVNPE	RAS-6WHVNPE
					
RAS-4WHNPE	**RAS-5WHNPE**	**RAS-6WHNPE**	**RAS-8WHNPE**	**RAS-10WHNPE**	
					

YUTAKI M RASM-(3-6)(V)NE Factory setting

RASM-3VNE	RASM-4VNE	RASM-5VNE	RASM-6VNE
			
	RASM-4NE	**RASM-5NE**	**RASM-6NE**
			

◆ DSW4 / RSW1: Refrigerant cycle number setting (No setting is required)

Setting before shipment		

◆ DSW5: End terminal resistance (No setting is required)

Setting before shipment	

◆ DSW6: Additional setting (No setting is required)

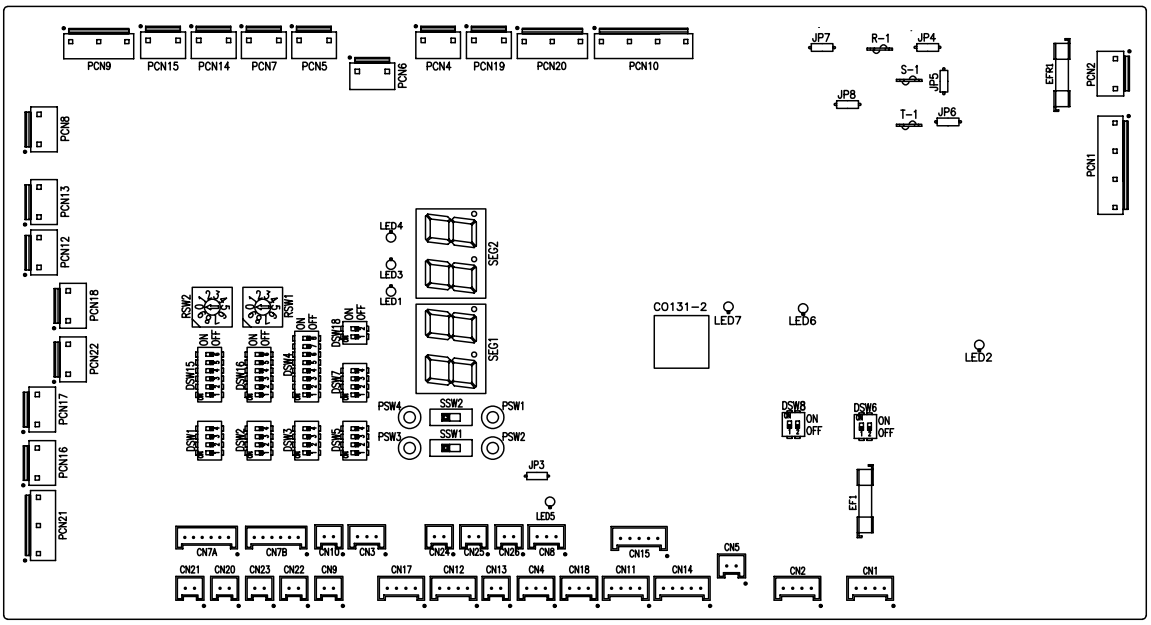
Setting before shipment	

10.6.1.3 LED indication

LED 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

10.6.2 YUTAKI unit

10.6.2.1 Location of DIP switches and rotary switches



10.6.2.2 Function of DIP switches and rotary switches

NOTE

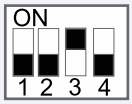
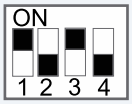
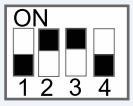
- *The mark "■" indicates the dip switches positions.*
- *No mark "■" indicates pin position is not affected.*
- *The figures show the settings before shipment or after selection.*
- *"Not used" means that the pin must not be changed. A malfunction might occur if changed.*

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.

◆ DSW1: Additional setting 0

Factory setting. No setting is required.

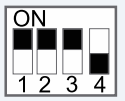
YUTAKI S (*)		
YUTAKI S COMBI (*)		
YUTAKI S80	1~ 230V 50Hz	3N~ 400V 50Hz
		
YUTAKI M (*)		

NOTE

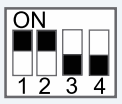
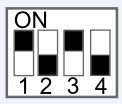
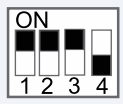
(*): In case of installing the "Cooling kit" accessory, set the pin 4 of DSW1 to ON in order to enable the cooling operation.

◆ DSW2: Unit capacity setting

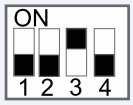
Factory setting. No setting is required.

2.0 HP	2.5 HP	3.0 HP	4.0 HP	5.0 HP	6.0 HP	8.0 HP	10.0 HP
							

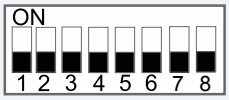
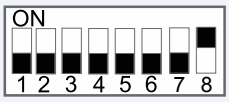
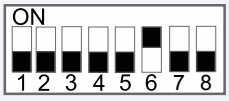
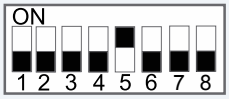
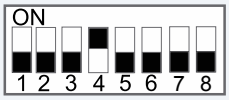
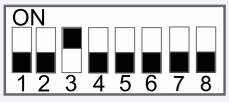
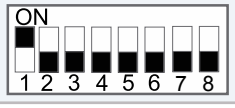
YUTAKI CASCADE CONTROLLER:
Setting is required in order to match with the model of the YUTAKI slave installed.

Factory setting	3.0 HP	4.0 HP	5.0 HP	6.0 HP	8.0 HP	10.0 HP
						

◆ DSW3: Additional setting 1

Setting before shipment	
1-step heater for 3-phase unit	

◆ DSW4: Additional setting 2

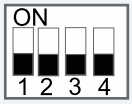
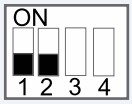
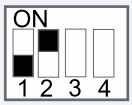
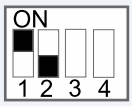
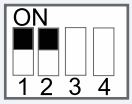
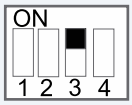
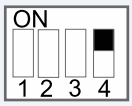
Setting before shipment	
DHW defrost	
Heater forced OFF	
Unit and installation pipes antifreeze protection	
Standard / ECO water pump operation	
Electric heater or boiler emergency mode	
DHW tank's heater operation	
- Open SV1/2 for vacuum and R-410A refrigerant recovery function (YUTAKI S80) - DHW 3-way valve forced ON (All models) - Not available for YUTAKI CASCADE CONTROLLER	
- Disabled R-134a compressor (YUTAKI S80) - Mirror function (YUTAKI M) - Not available for YUTAKI CASCADE CONTROLLER	

⚠ 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.*

◆ DSW5: Additional setting 3

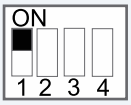
In the cases where the outdoor unit is installed into a location where its own outdoor ambient temperature sensor can not give a suitable temperature measurement to the system, it is available the 2nd outdoor ambient temperature sensor as accessory. By means of DSW1&2 setting, the preferable sensor for each circuit can be selected.

Factory setting	
Outdoor unit sensor for circuits 1 and 2.	
Outdoor unit sensor for circuit 1; Auxiliary sensor for circuit 2.	
Auxiliary sensor for circuit 1; Outdoor unit sensor for circuit 2.	
Auxiliary sensor instead of outdoor unit sensor for both circuits.	
4-20 mA setting temperature (Only manual operation) - Not available for YUTAKI CASCADE CONTROLLER	
Use the maximum temperature value between Two3 (boiler / heater thermistor) and Two (water outlet thermistor) for water control - Not available for YUTAKI CASCADE CONTROLLER	

◆ DSW6: Not used

Factory setting (Do not change)	

◆ DSW7: Additional setting 4

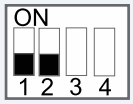
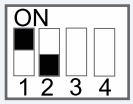
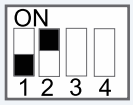
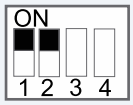
Factory setting	
Integrated DHW tank version (YUTAKI S80 only)	
Compatibility with ATW-RTU-04 (When cooling mode operation is needed) (Except YUTAKI S 80)	

◆ DSW8: Not used

Factory setting (Do not change)	

◆ DSW18: Additional setting 5 (Capacity control function for YUTAKI S80 only)

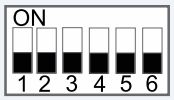
This function allows the capacity control by modifying the start and stop conditions of the second cycle, depending on the heat load of the installation when the water temperature is low.

Factory setting	
Normal power at start (Medium heat load at low water temperature)	
High power at start (High heat load at low water temperature)	
Low power at start (Low heat load at low water temperature)	
Very high power at start (Very high heat load at low water temperature)	

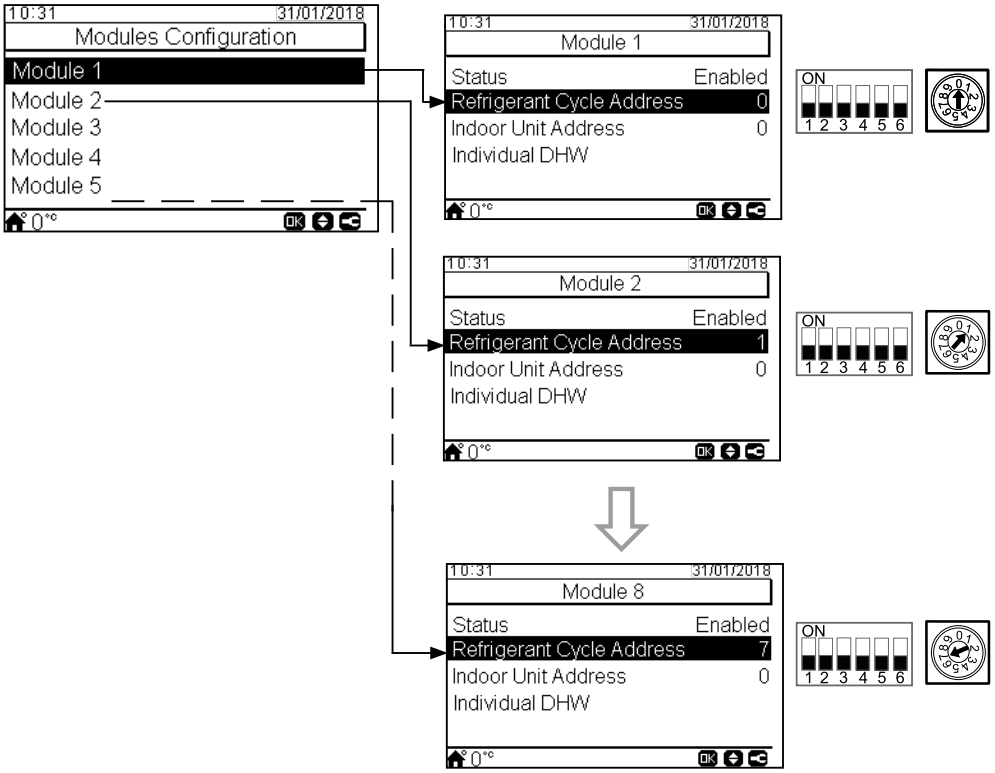
◆ DSW15 & RSW2: Refrigerant cycle number setting for YUTAKI CASCADE CONTROLLER

Set and assign to each outdoor unit a different refrigerant cycle number through DSW4 and RSW1 on the outdoor units PCB.

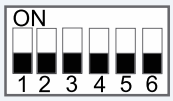
Set for each unit the same refrigerant cycle than its outdoor unit (DSW15 and RSW2).

	DSW15	RSW2
Factory setting		

It is recommended to set the refrigerant cycle number from 0 and correlatively (1,2,3,....) per each module in order to match whit the address number shown in the LCD remote controller. If a different rule is used for assign the refrigerant cycle number it is necessary to set the is set the same refrigerant cycle number in the LCD remote controller.



◆ DSW16 & RSW1: Not used

	DSW16	RSW1
Factory setting		

NOTE

Don't change this setting, otherwise malfunction will be occur.

◆ SSW1: Remote/Local

Factory setting Remote operation	Remote Local 
Local operation (Do not use in YUTAKI CASCADE CONTROLLER)	Remote Local 

◆ SSW2: Heat/Cool (when SSW1 is in local setting)

Factory setting Heat operation	Heat Cool 
Cooling operation (when cooling kit installed) (Do not use in YUTAKI CASCADE CONTROLLER)	Heat Cool 

10.6.2.3 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	Inverter transmission (YUTAKI S80 only)
LED6	Yellow	H-Link transmission
LED7	Yellow	H-Link transmission for unit controller

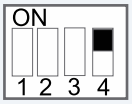
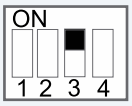
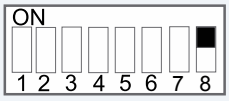
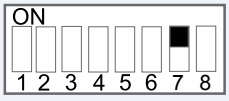
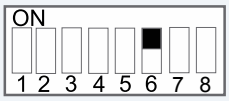
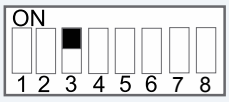
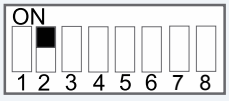
11. Optional functions

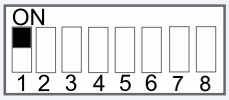
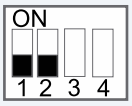
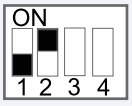
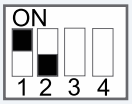
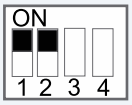
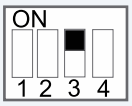
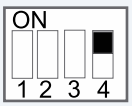
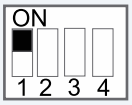
Index

11.1 Indoor unit 260
11.1.1 Optional functions by DSW setting 260
11.1.2 Optional functions by Unit controller (PC-ARF(H/C)E) 262
11.1.3 Optional external input/output configuration signals 264
11.2 Additional functions by accessory sensor 266
11.3 Change of defrost condition 267
11.4 Optional external output signals for outdoor units and YUTAKI M units 268

11.1 Indoor unit

11.1.1 Optional functions by DSW setting

Code	Optional function description	Explanation
DSW1#4:ON 	Heating & Cooling (ON) Unit	In case of cooling operation, this DSW should be set to ON + Cooling kit accessory
DSW3#3:ON 	1 step heater for 3 phase unit option	This option can be used to switch all 3 steps of the electric heater at the same time, by means of a DIP-switch setting, in order to prevent 3-phase imbalance by the electric heater steps.
DSW4#8:ON 	DHW Defrost	This function allows to perform the defrost operation at the DHW tank instead of at the indoor water installation. Not applicable to YUTAKI CASCADE CONTROLLER.
DSW4#7:ON 	Heating Heater forced OFF	This function forces a permanent OFF of the heater when selecting an installation configuration without the electric heater of the unit
DSW4#6:ON 	Unit and pipes installation freeze protection	This function allows to start water pump in very low conditions.
DSW4#5:ON 	Standard / Economic water pump operation	This function allow to start/stop water pump by two conditions
DSW4#4:ON 	Emergency Heater operation manual option	In the event of outdoor unit failure, the required heating can be provided by an electric heater or by a boiler.
DSW4#3:ON 	DHW Heater Operation	The electric heater of the domestic hot water tank is disabled by factory setting. This function allows to activate its operation if needed.
DSW4#2:ON 	Open SV1/2 for vacuum and refrigerant R410a recover function (YUTAKI S80) (Condition 1) DHW 3 way valve forced ON (Condition 2)	Condition 1 (Only for YUTAKI S80): In the process of vacuum and R-410A recovery of YUTAKI S80 it is very important to supply power to the indoor unit and to activate this function by DSW setting. Thereby, solenoid valves SV1 and SV2 of the indoor unit are opened to allow the operation of vacuum and refrigerant charge inside the indoor unit. It is very important to bring the DSW back to its original position when finishing the whole procedure. Condition 2 (all units, except YUTAKI CASCADE CONTROLLER): When combination with domestic hot water tank, the activation of this function changes the position of the 3-way valve to the DHW operation position, then the unit is forced to work against the heating coil of the DHW tank. This can be used, for example, for a quick water filling of the DHW tank's heating coil.

Code	Optional function description	Explanation
DSW4#1:ON 	Compressor R134a disabled (S80) (Condition 1) Remote control box for YUTAKI M (Condition 2)	Condition 1 (Only for YUTAKI S80): This function disables the compressor for the 2nd cycle (R-134a compressor), so that the unit is forced to operate at medium/low outlet water temperatures (YUTAKI S) Condition 2 (Only for YUTAKI M): This function activates the communication between YUTAKI M PCB and the PCB of the dedicated accessory for mirror function ATW-YMM-01.
DSW5#1:OFF;2#OFF 	C1 : Average OU Sensor C2 : Average OU Sensor	A 2nd outdoor ambient temperature sensor is available as an accessory, in case that the built-in ambient temperature sensor of the outdoor unit cannot provide a reliable temperature measurement to the system because of restraints of the installation location. The preferred sensor for each circuit can be selected by means of DSW setting.
DSW5#1:OFF;2#ON 	C1 : Average OU Sensor C2 : Average Aux Sensor	
DSW5#1:ON;2#OFF 	C1 : Average Aux Sensor C2 : Average OU Sensor	
DSW5#1:ON;2#ON 	C1 : Average Aux Sensor C2 : Average Aux Sensor	
DSW5#3:ON 	4-20mA setting temperature (Only Manual operation)	Not applicable to YUTAKI CASCADE CONTROLLER. In case of Manual operation, heating or cooling water setting operation can be overridden by external controller using 4~20mA input (CN5). In order to allow override operation a DSW setting must be done, otherwise values selected by 7-segment will be used. When override operation is allowed, external controller decides the target temperature by inputting a 4~20mA value.
DSW5#4:ON 	Use max (Two/Two3) for water control	Some installation needs big buffer tank and in combination with auxiliary heating (boiler, pellets, solar panels. Etc…), the control of the water can be done by external temperature sensor (Two3) to heat this buffer tank. Refer to *"Manual operation"* chapter in Service Manual.
DSW7#1:ON 	S80 Integrated Tank	In case of combine YUTAKI S80 with integrated tank, DSW must be ON
DSW18#1:OFF; #2:OFF 	High capacity control function: Power start	Not applicable to YUTAKI CASCADE CONTROLLER. Cascade cycle enabled to operate at medium water temperatures
DSW18#1:ON; #2:OFF 	High capacity control function: High Power start	Not applicable to YUTAKI CASCADE CONTROLLER. Cascade cycle enabled to operate at lower water temperatures
DSW18#1:OFF; #2:ON 	High capacity control function: ECO Power start	Not applicable to YUTAKI CASCADE CONTROLLER. Cascade cycle enabled to operate at higher water temperatures

Code	Optional function description	Explanation
SSW1 Remote Local 	Remote or Local operation (Manual)	Not applicable to YUTAKI CASCADE CONTROLLER. Refer to *"Manual operation"* chapter in Service Manual.
SSW2 Heat Cool 	Cool and Heat operation in case of Local (Manual)	Not applicable to YUTAKI CASCADE CONTROLLER. Refer to *"Manual operation"* chapter in Service Manual.

11.1.2 Optional functions by Unit controller (PC-ARF(H/C)E)

11.1.2.1 Optional functions for Space Heating or Space Cooling

Optional function	Explanation	Model
Floor screed drying function (Circuits 1 & 2)	This function is used exclusively for the process of drying screed that has been newly applied to floor heating system. The water temperature set-point follows a predetermined schedule upon activation of the floor screed drying function. For more information refer to Water control chapter	A
Heating Auto ON/OFF	At higher outside temperatures it doesn't make sense to keep heating the building. The YUTAKI S System will switch the heating off when the daily average outdoor temperature of previously day rises above the Summer Switch Auto On/Off Activation Temperature. For more information refer to *"Space water temperature control"* chapter in Service Manual.	A
Auto Heat-Cool	Only available for Cooling and Heating models and cooling mode enabled. By using auto summer switch off average, user can use auto heat cool mode. The end-user sets the desired operation mode on the user interface: Heating, Cooling or Automatic. When Automatic is selected, the change of the operation mode is based on: Averaged outdoor temperature: the operation mode will be changed in order to always be within range determined by the space heating OFF temperature for heating and the space cooling ON temperature for cooling. If the outdoor temperature drops, the operation mode switches to heating and vice versa. For more information refer to *"Space water temperature control"* chapter in Service Manual.	S/SC/M/ YCC
Outdoor temperature average timer	The average timer corrects the influence of ambient temperature variations. The weather-dependent set point calculation is done on the average outdoor temperature. The outdoor temperature is averaged over the selected time period. For more information refer to *"Space water temperature control"* chapter in Service Manual.	A

11.1.2.2 Optional functions for DHW

Optional function	Explanation	Model
DHW anti-Legionella protection	A specific setting is available to protect the DHW system against Legionella, which raises up the DHW temperature over the normal DHW tank temperature setting (using the electric heater of the DHW tank and/or the heat pump) on a periodic basis. For more information refer to *"Sanitary Water Operation"* chapter in Service Manual.	A
DHW re-circulation	This function allows the activation of the water pump for the re-circulation of the hot water from the DHW tank by means of the heat pump. This function can also be used with the anti-legionella protection function. For more information refer to *"Sanitary Water Operation"* chapter in Service Manual.	A
DHW boost	With this function enabled, it is possible to request a heating up of the DHW when user requires an instantaneous delivery of DHW. For more information refer to *"Sanitary Water Operation"* chapter in Service Manual.	A

DHW Mode	DHW operation has two different modes, STANDARD Mode and HIGH DEMAND Mode: • STANDARD Mode: The heating of the domestic hot water shall be started when water temperature in tank is low enough for Heat Pump to be started. DHW is always started heated by Heat Pump. • HIGH DEMAND Mode: The heating of the domestic hot water is started if differential is bigger than T_{DHWON}. It will be started with water tank heater only unless water temperature in tank goes below Heat Pump starting temperature. For more information refer to *"Sanitary Water Operation"* chapter in Service Manual.	A
DHW Control	Unit has 2 DHW heating up control modes that are selected by PC-ARF(H/C)E: H.EFFICIENCY MODE: Control to keep best efficiency (COP). H.SPEED MODE: Control to heat tank as fast as possible.	A

11.1.2.3 Optional functions for Heat pump

Optional function	Explanation	Model
Hydraulic separator combination	In some cases, water pump of the YUTAKI unit is not sized for big heating installation (small water pump). In this case, a hydraulic separator or buffer tank and secondary water pump has to be used to ensure proper water pump dimensioning. The boiler is configured in parallel with the heat pump. A hydraulic separator or buffer tank has to be used to ensure proper hydraulic balancing. Additional Water pump (WP3) and water sensor (Two3) are needed for boiler combination control (automatic added when Boiler combination is enabled). For more information refer to *"Space water temperature control"* chapter in Service Manual.	S/SC/M/ S80
Electrical heater or boiler emergency mode	For the use of the electrical heater or boiler in case of outdoor unit fault, additional setting shall be applied into IU setting: Electrical heater emergency can be both automatic or manual switched ON by the user and the configuration must be done from the Unit controller For more information refer to *"Auxiliary electric heater for space heating"* chapter in Service Manual.	A
Power meter data control	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 through the unit controller. By this, every pulse input is added into its 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). For more information refer to *"Heat Pump optional functions"* chapter in Service Manual.	S/SC/M/ S80
Capacity data control	Due to usage of Water temperature inlet and outlet + water flow leve, a estimation of capacity can be checked. This screens show the value of kWh for each zone (Heating,Cooling, DHW, swimming pool and its total) and also let to see the values month by month. For more information refer to *"Heat Pump optional functions"* chapter in Service Manual.	S/SC/M/ S80
Smart Function	This function can be used to block or limit the heat pump or increase demand due to electricity availability. For more information refer to *"Heat Pump optional functions"* chapter in Service Manual.	A
Air Purge	Air purge function drives the pump in a way for evacuating air bubbles in the installation. For more information refer to *"Heat Pump optional functions"* chapter in Service Manual.	S/SC/M/ S80
Unit Test Run	Test run is a working mode used when commissioning the installation. Some settings are made to let the installer an easy job. For more information refer to *"Heat Pump optional functions"* chapter in Service Manual.	S/SC/M/ S80
Night shift	Night shift operation reduce compressor load in order to reduce environmental noise during night. It can be configured as a daily timer or launched from favourite button. For more information refer to *"Heat Pump optional functions"* chapter in Service Manual.	S/SC/M/ S80

11.1.2.4 Optional functions for Unit controller (PC-ARF(H/C)E)

Optional function	Explanation	Model
Favourite action	This favourite button has the possibility to customize the action according on system configuration: Holiday Eco/Comfort Timer Night shift DHW Boost	A
UTC Zone	UTC Zone: Europe spans 7 primary time zones (5 of them can be seen on the map in this article, while 2 other zones contain the European part of Kazakhstan and some very eastern territories of European Russia). Most of European countries use daylight saving time and switch to it at the same moment, which is 'harmonise' their summer time adjustment	A
European summer time	When European summer time is activated, it should change the time when the country / UTC zone is doing it.	A
Holidays	Holidays function is only available for room thermostat view of PC-ARF(H/C)E. Holidays let the user specify a date and hour for the Room Setting to be OFF with the configured setting.	A

11.1.3 Optional external input/output configuration signals

The system has 7 input and 4 output optional signals (+ 4 output signals when using accessory). The new YUTAKI series allow different ports to be configured for those I/O signals, as well.

The user can configure those input signal to perform different functions from the unit controller. This is briefly explained in the next tables:

Input signals and input ports

Code	Name	Port	Input
i1	Input 1	TB2 #13&14	230 V
i2	Input 2	TB2 #13&15	230 V
i3	Input 3	TB2 #16&17	230 V
i4	Input 4	TB2 #16&18	230 V
i5	Input 5	TB2 #16&19	230 V
i6	Input 6	TB2 #16&20	230 V
i7	Input 7	TB2 #16&21	230 V

Input functions (To be configured from the unit controller):

Function #	Input	Description
0	Disabled	-
1	Demand ON/OFF	Send Demand ON or OFF Operation to Circuit 1 and Circuit 2
2	Smart Act./SG Ready Input 1	This function must be used to block or limit the heat pump when restricted by Electric company. It allows an external Smart switch device to switch off or reduce consumption of the heat pump during time of peak electricity demand. In case of use of Smart Grid Ready application, this input is used as a digital input 2 and allows four different operating modes
3	Swimming pool	When YUTAKI model is used to warm th swimming pool water, this input is used as a feedback for swimming pool water pump.
4	Solar	In case of combine YUTAKI with solar panels, this input is used as a feedback for solar station ready operation.
5	Operation mode	Cool/Heat must be changed by an input of an external contact signal. Contact signal is edge detection; Cool/Heat changeover by unit controller is also available
6	DHW boost	With this function enabled, it is possible to request a heating up of the DHW when user requires an instantaneous delivery of DHW.
7	Power meter 1	Input used as kW/h pulse count for Energy data recording **NOTE** *Not available for PC-ARFCE (YUTAKI CASCADE CONTROLLER).*
8	Demand ON/OFF C1	Send Demand ON or OFF Operation only to Circuit 1
9	Demand ON/OFF C2	Send Demand ON or OFF Operation only to Circuit 2
10	Forced heating	Forced Heating Demand by input of contact signal from outside
11	Forced cooling	Forced Cooling Demand by input of contact signal from outside
12	Power meter 2	Input used as kW/h pulse count for Energy data recording **NOTE** *Not available for PC-ARFCE (YUTAKI CASCADE CONTROLLER).*
13	ECO mode C1 & C2	Water temperature setting for Circuit 1 and Circuit 2 it is reduced by ECO operation mode (Default 3ºC) by input of contact signal from outside
14	ECO mode C1	Water temperature setting for Circuit 1 it is reduced by ECO operation mode (Default 3ºC) by input of contact signal from outside
15	ECO mode C2	Water temperature setting for Circuit 2 it is reduced by ECO operation mode (Default 3ºC) by input of contact signal from outside
16	Force OFF	Force OFF operation for unit. RCS will continue as normally set but will show indication that operation is forbidden
17	SG Ready Input 2	In case of want to use Smart Grid Ready application, this input is used as a digital input 2 and allow four different operating modes

Output signals and output ports

Code	Name	Port	Output
o1	Output 1	TB2 #34 (N) & 35 (L)	230 V
o2	Output 2	TB2 #34 (N) & 36 (L)	230 V
o3	Output 3	TB2 #37&38	Free voltage signal
o4	Output 4	TB2 #39&40	Free voltage signal
o5	Output 5	CN20 #1-2	12Vdc signal
o6	Output 6	CN21 #1-2	12Vdc signal
o7	Output 7	CN22 #1-2	12Vdc signal
o8	Output 8	CN23 #1-2	12Vdc signal

Output functions (To be configured from the unit controller)

Function #	Output	Description
0	Disabled	
1	3WV SWP	In case of combine YUTAKI with swimming pool, this output is used to drive 3 way valve swimming pools.
2	WP3	In case of combine YUTAKI with boiler or hydraulic separator, this output is used to drive water pump 3.
3	Boiler combination	In case of combine YUTAKI with boiler, this output is used to switch ON it.
4	Solar pump	In case of combine YUTAKI with solar panel, this output is used to drive water pump station
5	Alarm signal	Output when an “Alarm Code” is received from Indoor Unit or outdoor unit.
6	Operation signal	Output in case that "Thermo ON" signal in any condition
7	Cooling signal	Output in case that "Thermo ON" signal in Cooling operation
8	Demand-ON signal circuit 1	Signal is enabled when circuit 1 is operating in Demand-ON
9	Heating signal	Output in case that "Thermo ON" signal in Heating operation
10	DHW signal	Output in case that "Thermo ON" signal in DHW operation
11	Defrost	Output if the operation state of the outdoor unit when is defrosting.
12	DHW re-circulation pump	In case of re-circulation pump enabled for HSW tank
13	Heater combination (S80/M/YCC) relay 1	In case of Heater operation for YUTAKI S80, YUTAKI CASCADE CONTROLLER or YUTAKI M. Output for Relay 1.
14	Heater combination (S80/M/YCC) relay 2	In case of Heater operation for YUTAKI S80, YUTAKI CASCADE CONTROLLER or YUTAKI M. Output for Relay 2.
15	Solar overheat	Output in case that solar temperature signal is active when solar overheat (only when solar combination status is total control)

11.2 Additional functions by accessory sensor

HITACHI offers to its users the option to add more functions to the inputs from signals coming from some specific sensors. The configuration for this purpose is explained below:

I/O Terminal name		Port for setting (Connector number)	Factory default setting		Input/Output type
I/O	Display		Setting contents	Function #	
Sensor 1	A1	CN26 #2	Disabled	0	NTC
Sensor 2	A2	CN25 #1-2	Disabled	0	NTC
Sensor 3	A3	CN5 #1	Disabled	0	NTC

Function of sensors

Function #	Input	Description
1	Boiler combination/Two3	This sensor is used in case to combine any YUTAKI model with an external boiler (and in case to combine a YUTAKI S80 with an electrical heater)
2	Swimming pool	When combining YUTAKI with swimming pool, this sensor is used to read the temperature from the water of the swimming pool.
3	Solar panel sensor	When combining YUTAKI with solar panels, this sensor is used to read the temperature from the solar panel.
4	Zone 1 & 2 ambient sensor	If Aux1 and Aux2 sensors are both connected and enabled at the unit controller configuration, the detection of ambient temperature value is carried out by these sensors. The ambient temperature setting for each circuit is set from the unit controller or central platform. The temperature value detected by each sensor is applied to the corresponding circuit.
5	Zone 1 ambient sensor	If Aux1 and Aux2 sensors are both connected and enabled at the unit controller configuration, the detection of ambient temperature value is carried out by these sensors. The ambient temperature setting for each circuit is set from the unit controller or central platform. The temperature value detected by each sensor is applied to the circuit 1.
6	Zone 2 ambient sensor	If Aux1 and Aux2 sensors are both connected and enabled at the unit controller configuration, the detection of ambient temperature value is carried out by these sensors. The ambient temperature setting for each circuit is set from the unit controller or central platform. The temperature value detected by each sensor is applied to the circuit 2.
7	Second outdoor ambient	An outside temperature sensor can be directly connected to the controller in case the heat pump is located in a position not suitable for this measurement.

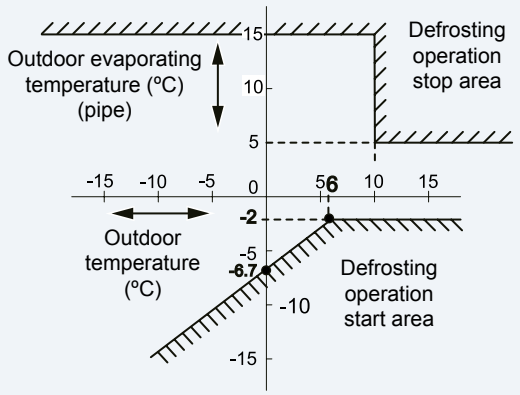
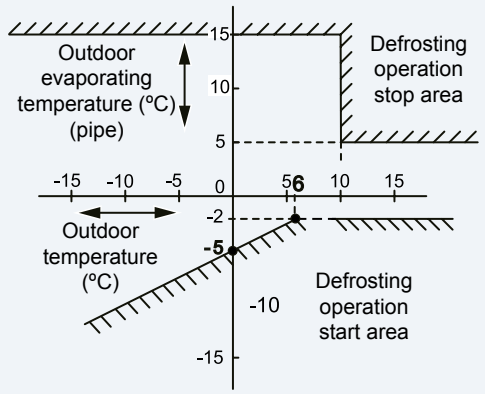
11.3 Change of defrost condition

These optional function is available for being selected using the PSW switches and 7-segment on the PCB of the Outdoor Units and YUTAKI M unit PCB:

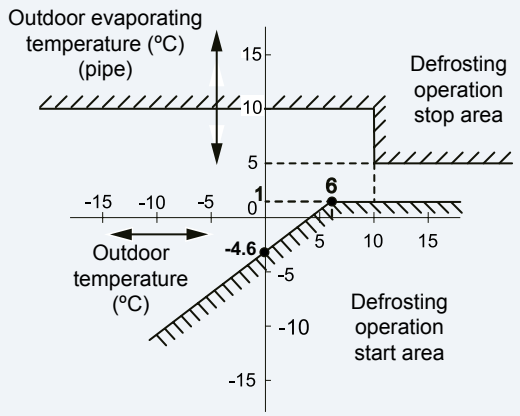
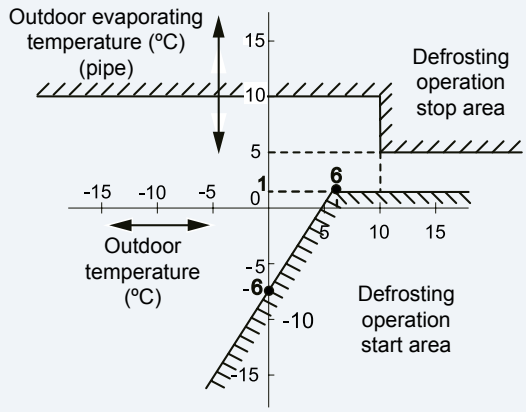
Indication	Input signal	Application
dA	Change of defrost condition	This function allows to shift the temperature conditions in order to cause an earlier defrosting. It is useful in installations placed in very cold regions, where frost generates continuously; enabling an earlier defrosting operation results in a lower amount of accumulated frost, therefore keeping higher heating capacity values.

Press “PSW1” and select the setting condition “1” at the change of defrost condition “dA”.

Example for RAS-(4-10)WH(V)NPE and PCB1 for YUTAKI M (RASM-(3-6)(V) NE)

Setting condition	Standard Specifications (factory default state)	Heating specification
	Function selection setting dA :0	Function selection setting dA : 1
Temperature conditions under defrosting operation		

Example for **RAS-(2/2.5/3)WHVNP**

Setting condition	Standard Specifications (factory default state)	Heating specification
	Function selection setting Jo :0	Function selection setting Jo : 1
Temperature conditions under defrosting operation		

11.4 Optional external output signals for outdoor units and YUTAKI M units

◆ Output signals through 7-segment display on the unit PCB

The system has several output signals, which can be selected using the following connectors of the outdoor unit and YUTAKI M PCB:

- Output connector CN7, which has two ports to configure two optional output signals.

The selection of these output signals represents the selection of some optional functions programmed in the PCB of the RAS unit through the 7-segment display.

NOTE

- *Do not set same function to multiple output ports. If set, the setting of the higher output number is cleared to 00.*
- *Please refer to the Service Manual for detailed information of optional external input and output signals.*

◆ Output signals on outdoor units and YUTAKI M units

Indication	Output signal	Application
0	No setting application	No setting.
1	Operation signal	This signal allows to notify that the unit is operating. It enables to start up additional systems such as humidifiers, fans and other additional air-conditioning systems.
2	Alarm signal	This signal allows to notify that protection devices have been activated and to transfer it to additional systems.
3	Compressor ON signal	This signal allows to notify that the compressor is activated. This function can be applied for situations such as checking signals during remote-control operation and for the interlock of the RAS unit.
4	Defrost operation signal	This signal allows to notify that the unit is under defrosting operation.

HITACHI

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

CE

HITACHI certifies that our products have met EU consumer safety, health and environmental requirements.

Johnson Controls-Hitachi Air Conditioning Spain, S.A.U. is certified with: ISO 9001 of AENOR, Spain for its Quality Management accordance with the standard ISO 14001 of AENOR Spain for its Environmental Management systems accordance with the standard.

HITACHI air conditioning products are manufactured according to:
ISO 9001 of JQA, Japan for its Quality Management accordance with the standard
ISO 14001 of JACO, Japan for its Environmental Management accordance with the standard.

041-K002-01~24

HITACHI meets the requirements of the KEYMARK Certification Scheme. See Heat Pump KEYMARK database for detailed information.

HITACHI participates in the Eurovent Certification Programme; the certified data of certified models are listed in the Eurovent Certification Online Directory (www.eurovent-certification.com).

Printed in Spain