

Hot Water Module

MMW-AP0481CHQ-E
MMW-AP0481CHQ-TR



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1. Summaries of product characteristics

CONCEPT

- To design and produce a high temperature hot water module, capable of producing up to 82°C outlet water temperature, whilst maximizing the performance and efficiency of the entire VRF system.
- To be used in both space heating and domestic hot water applications. Typical applications include hotel, office and residential apartment suits.
- To create a single solution for our customers heating and domestic hot water requirements.

Toshiba SHRM-e High temperature Hot Water Module – CHARACTER

- New Design, specifically engineered for VRF application
- Operating Control designed specifically to maximize both performance and efficiency.
- Capacity line up - 14 kW
- All models come in single phase (220 - 240 V ~ 50 Hz)

Domestic Hot Water Installation Example

Typical Installations examples include –

- Office use, where there is a requirement for DHW, such as small canteen or rest room.
- Apartment block, where there is a requirement for DHW, such as kitchen, shower and bath.
- Hotel use, where there is an auxiliary requirement for DHW, for the purpose of cleaning and sanitary operations.
- Small Businesses, for example coffee shops, hairdressers etc, where there is a requirement for a single heating solution.

Space Heating Installation Example

Typical Installations examples include –

- Office use, where there is a requirement for space heating via fan coils or AHU's.
- Apartment, where there is a requirement for space heating via under-floor heating.
- Hotel use, where there is an auxiliary requirement for space heating via a combination of fan coils, AHU or under-floor heating circuits.
- Small Businesses, for example coffee shops, hairdressers etc, where there is a requirement for a single heating solution.

Connectable units

VRF products

VRF products	SMMS-i	SMMS-i (5 HP, 6 HP)	SHRM-i	Mini-SMMS-e	SMMS-e	SHRM-e
Connectable	—	—	—	—	—	✓

- BMS units can not be connected with these units.
- The Fresh Air Intake type and Air to Air Heat Exchanger with DX Coil can not be connected with the same refrigerant system.

Remote controller

- RBC-AMT32E
- RBC-AMS41E
- RBC-AMS55E-ES, RBC-AMS55E-EN
- RBC-AS41E
- TCB-CC163TEL2
- RBC-ASC11E, RBC-ASC11E-TR

Allowable length / height difference of refrigerant piping

■ System

High temperature Hot Water Module (H-HWM) is connectable to only SHRM-e.

The system does not work when it connect to the SMMS-i, SMMS-e, MiNi-SMMS-e and SHRM-i.

The Fresh Air intake type and Air to Air Heat Exchanger with DX Coil cannot be connected with the same refrigerant system.

SHRM-e system restrictions

In case of connecting at least one Hot Water Module in SHRM-e system, all of Flow Selector unit type should be Single port type Flow Selector unit (long piping model) or Multi port type Flow Selector unit. Model name of usable Flow Selector unit: RBM-Y1124FE, RBM-Y1804FE, RBM-Y2804FE, RBM-Y1801F6PE, RBM-Y1801F4PE The Fresh Air intake type and Air to Air Heat Exchanger with DX Coil cannot be connected with the same refrigerant system. The SHRM-e system can also be connected to a Mid temperature Hot Water module (M-HWM).

M-HWM: Mid temperature Hot Water Module

H-HWM: High temperature Hot Water Module

M-HWM connection		With M-HWM & H-HWM
Max. No. of combined outdoor units		3 units
Max. capacity of combined outdoor units		54 HP
Max. No. of combined indoor units		32 units
Max. capacity of combined indoor units and M-HWM & H-HWM	H2 ≤ 15 m	200%
	H2 > 15 m	125%

Restriction on Mid temperature Hot Water Module (M-HWM) and High temperature Hot Water Module (H-HWM) connection

Indoor connection capacity (*1)	Total	Standard indoor unit + M-HWM + H-HWM	90 - 200% (*2) (*3)
		Standard indoor unit + M-HWM	90 - 135% (*2) (*3)
	Allowed capacity	Standard indoor unit	50 - 120% (*2)
		M-HWM	0 - 67.5% (*2) (*3)
		H-HWM	0 - 100% (*2) (*3)
		M-HWM + H-HWM	0 - 100% (*2) (*3)
Number of combined indoor units, M-HWM and H-HWM	Total	Standard indoor unit + M-HWM	90 - 135% (*2) (*3)
		Standard indoor unit + M-HWM + H-HWM	2 - 32
	Allowed number	Standard indoor unit + M-HWM	2 - 32
		Standard indoor unit	2 - 32
		M-HWM	0 - 14
		H-HWM	0 - 12
		M-HWM + H-HWM	0 - 14
		Standard indoor unit + M-HWM	2 - 32

*1: Ratio of connected total indoor unit capacity to outdoor unit capacity.

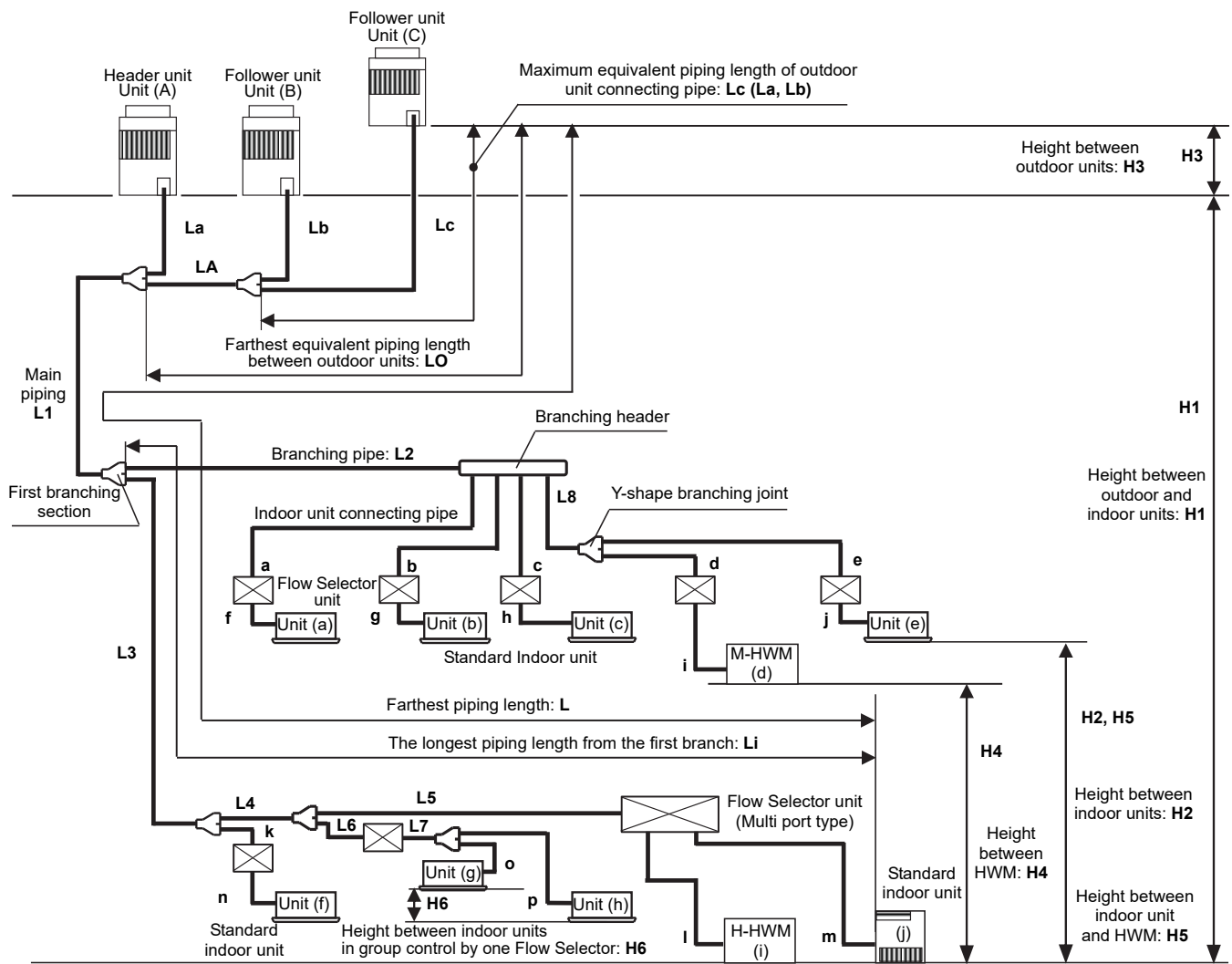
*2: Maximum indoor connection capacity is varied depending on the height difference between indoor unit H2, H4, H5.

Combination of indoor units		SHRM-e
Standard indoor unit + M-HWM + H-HWM	H2, H4, H5 ≤ 15 m	Max.200% (Standard indoor unit <120%)
	H2, H4, H5 > 15 m	Max.125% (Standard indoor unit <100%)
Standard indoor unit + M-HWM	H2, H4, H5 ≤ 15 m	Max.135% (Standard indoor unit <120%)
	H2, H4, H5 > 15 m	Max.125% (Standard indoor unit <100%)

*3: M-HWM and H-HWM connecting capacity should be smaller than standard indoor unit.

NOTE

Design the system that total capacity of simultaneous heating operation is 100% or less. If total capacity of simultaneous heating is over 100%, then each indoor units or Hot Water Module performance is descended.



Item				SHRM-e		Pipes
				Without HWM	With HWM	
Pipe length	Total extension of pipe (liquid pipe, real length)	Less than 34 HP or less		300 m	300 m	LA + La + Lb + Lc + L1 + L2 + L3 + L4 + L5 + L6 + L7 + L8 + a + b + c + d + e + f + g + h + i + j + k + l + m + n + o + p
		34 HP or more		1000 m (*3)		
	Farthest piping length L (*1) (*2)		Equivalent length	200 m (*4)	200 m (*4)	Lc + LA + L1 + L3 + L4 + L5 + m + r
			Real length	180 m	180 m	
	Maximum equivalent length of main piping (*5)	H2,H4,H5 ≤ 3m	Equivalent length	100 m	100 m	L1
			Real length	85 m	85 m	
		H2,H4,H5 ≤ 3m	Equivalent length	120 m	120 m	
			Real length	100 m	100 m	
	Farthest equivalent piping length from the first branch Li (*1)	H2,H4,H5 > 3m	50 m	50 m	L3 + L4 + L5 + m	
		H2,H4,H5 ≤ 3m	65 m	65 m		
	Farthest equivalent piping length between outdoor units LO (*1)		15 m	15 m	LA + Lc (LA + lb)	
	Maximum equivalent length of pipes connected to outdoor units		10 m	10 m	Lc (La, Lb)	
	Maximum real length of terminal branching section to indoor units		30 m	30 m	a + f, b + g, c + h, d + l, e + j,	
Maximum real length of between Flow Selector unit and indoor unit	Single port type	15 m	15 m	f, g, h, i, j, n,		
	Multi port type	50 m (*6) (*7)	50 m (*6) (*7)	l, m		
Maximum equivalent length between branching section		50 m	50 m	L2, L3, L4, L5, L8		
Height difference	Height between outdoor and indoor units H1 (*8)	Upper outdoor units	70 m (*9) (*13)	70 m (*9) (*13)	-	
		Lower outdoor units	30 m (*10)	30 m (*10)		
	Height between indoor units H2 (*8)	Upper outdoor units	40 m	40 m	-	
		Lower outdoor units (*11)	15 m	15 m		
	Height between HWM H4 (*8)	Upper outdoor units	-	40 m	-	
		Lower outdoor units (*11)	-	15 m		
	Height between indoor units and HWM H5 (*8)	Upper outdoor units	-	40 m	-	
		Lower outdoor units (*11)	-	15 m		
	Height between outdoor units H3 (*12)		5 m	5 m	-	
<In case of connecting single port type Flow Selector unit and a branch of Multi port type Flow Selector unit to the indoor units.>						
Maximum equivalent length indoor units in group control by one single port Flow Selector unit Ln				30 m	30 m	L6 + L7 + o, L6 + L7 + p
Maximum real length between Flow Selector unit and indoor unit (*4)	Single port type		15 m	15 m	L7 + o, L7 + p	
	Multi port type		50 m	50 m	-	
Height difference between indoor units in group control by one Flow Selector unit H6				0.5 m	0.5 m	-

*1: Furthest outdoor unit from the first branch: (C), farthest indoor unit: (j)

*2: Total charging refrigerant is 140 kg or less

*3: When connecting the multiple indoor units to the single port type Flow Selector unit, wire the indoor unit to the remote controller to the single port type flow selection unit.

*4: Allowable values for length equivalent to furthest pipe are shown below and they vary according to performance rank of outdoor unit.
22.4 to 56.0: 180 m, 61.5 to 112: 195 m, 120: 200m

*5: As for 44 HP to 54 HP, contact our agent.

*6: The total piping length in one Flow Selector unit in case of branching to 4: 120 m (p + q + r + s + t + u), In case of branching to 6: 180 m.

*7: Length of whole pipe should be shorter than 50 m in one branch.

*8: As for 42 HP to 54 HP, contact our agent.

*9: If the height difference (H2, H4, H5) between indoor units or HWM exceed 3 m, set 50 m or less.

*10: 40 m is possible for a system that uses only the Flow Selector unit (multi port type), whose all the indoor units are 3 HP or higher, and working ambient temperature is 0°C or higher.

*11: When system capacity greater than 28 HP, height difference between indoor units or HWM is limited to 3 m. If the piping exceeds 3 m with a capacity greater than 28 HP there may be a case of capacity shortage in cooling.

*12: Ensure that the header unit is installed below all connected follower outdoor unit (s).
Possible product failure may occur if header unit is installed above any follower unit (s).

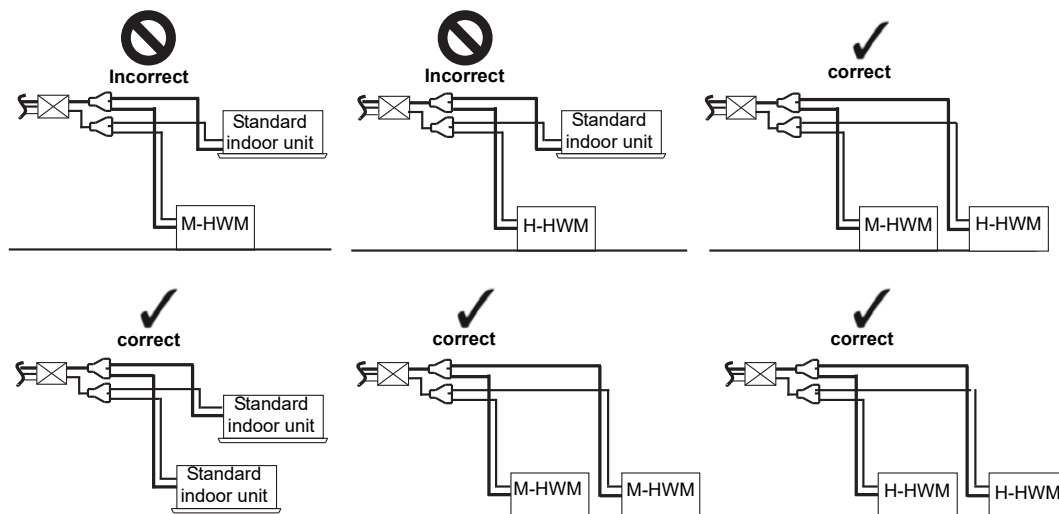
*13: Extension up till 90 m is possible with conditions below

- Outside Temperature Cooling operation: 10°C to 46°C (Dry-bulb temp.)
Heating operation: -5°C to 15.5°C (Wet-bulb temp.)
Simultaneous operation: 7 to 25°C (Dry-bulb temp.)
- Equivalent length of farthest piping from 1st branching Li < 50 m
- Real length of main piping L1 < 100 m
- Height difference between indoor units H2 < 3 m
- Height difference between FS units < 0.5 m
- Total capacity of connectable indoor units: 90% - 100%
- Single CDU, and up to 18 HP
- Minimum capacity of connectable indoor: unit 4 HP or Larger.

NOTE

It is prohibited to connect the standard indoor unit and the HWM to the same Flow Selector unit in SHRM-e system.

M-HWM: Mid temperature Hot Water Module
H-HWM: High temperature Hot Water Module



Outdoor unit connectable indoor units

- ▼ Capacity code of Mid temperature Hot water module (M-HWM) and High temperature Hot Water Module (H-HWM)
The capacity code of the Hot water module is different from the capacity code of the standard indoor unit.

Hot water module		Mid temperature		High temperature
		MMW-AP0271LQ-E	MMW-AP0561LQ-E	MMW-AP0481CHQ-E
Capacity rank type		027	056	048
Capacity code	Equivalent to HP (HP)	2.5	5	4.5
Equivalent to capacity	(kW)	7.1	14.0	12.5

▼ Capacity code of standard indoor unit

Capacity rank type		5	7	9	12	15	18	24	27	30	36	48	56	72	96
Capacity code	Equivalent to HP (HP)	0.6	0.8	1	1.25	1.7	2	2.5	3	3.2	4	5	6	8	10
Equivalent to capacity	(kW)	1.7	2.2	2.8	3.6	4.5	5.6	7.1	8.0	9.0	11.2	14.0	16.0	22.4	28.0

SHRM-e	Capacity code of outdoor unit (HP)	Maximum indoor unit quantity	Total capacity code of indoor units (HP) Standard indoor unit + M-HWM + H-HWM		Total capacity code of indoor units (HP) Standard indoor unit + M-HWM	
			H2,H4,H5 ≤ 15 m	H2,H4,H5 > 15 m	H2,H4,H5 ≤ 15m	H2,H4,H5 > 15 m
			Total capacity 90-200% (Standard indoor unit <120%)	Total capacity 90-125% (Standard indoor unit <100%)	Total capacity 90-135% (Standard indoor unit <120%)	Total capacity 90-125% (Standard indoor unit <100%)
MMY-MAP0806FT8P	8	18	7.2 to 16.0	7.2 to 10.0	7.2 to 10.8	7.2 to 10.0
MMY-MAP1006FT8P	10	22	9.0 to 20.0	9.0 to 12.5	9.0 to 13.5	9.0 to 12.5
MMY-MAP1206FT8P	12	27	10.8 to 24.0	10.8 to 15.0	10.8 to 16.2	10.8 to 15.0
MMY-MAP1406FT8P	14	31	12.6 to 28.0	12.6 to 17.5	12.6 to 18.9	12.6 to 17.5
MMY-MAP1606FT8P	16	32	14.4 to 32.0	14.4 to 20.0	14.4 to 21.6	14.4 to 20.0
MMY-MAP1806FT8P	18	32	16.2 to 36.0	16.2 to 22.5	16.2 to 24.3	16.2 to 22.5
MMY-MAP2006FT8P	20	32	18.0 to 37.0 (*1)	18.0 to 25.0	18.0 to 25.0 (*2)	18.0 to 25.0
MMY-AP2216FT8P	22	32	19.8 to 44.0	19.8 to 27.5	19.8 to 29.7	19.8 to 27.5
MMY-AP2416FT8P	24	32	21.6 to 48.0	21.6 to 30.0	21.6 to 32.4	21.6 to 30.0
MMY-AP2616FT8P	26	32	23.4 to 52.0	23.4 to 32.5	23.4 to 35.1	23.4 to 32.5
MMY-AP2816FT8P	28	32	25.2 to 56.0	25.2 to 35.0	25.2 to 37.8	25.2 to 35.0
MMY-AP3016FT8P	30	32	27.0 to 60.0	27.0 to 37.5	27.0 to 40.5	27.0 to 37.5
MMY-AP3216FT8P	32	32	28.8 to 64.0	28.8 to 40.0	28.8 to 43.2	28.8 to 40.0
MMY-AP3416FT8P	34	32	30.6 to 68.0	30.6 to 42.5	30.6 to 45.9	30.6 to 42.5
MMY-AP3616FT8P	36	32	32.4 to 72.0	32.4 to 45.0	32.4 to 48.6	32.4 to 45.0
MMY-AP3816FT8P	38	32	34.2 to 72.2 (*1)	34.2 to 47.5	34.2 to 49.4 (*2)	34.2 to 47.5
MMY-AP4016FT8P	40	32	36.0 to 74.0 (*1)	36.0 to 50.0	36.0 to 50.0 (*2)	36.0 to 50.0
MMY-AP4216FT8P	42	32	37.8 to 84.0	37.8 to 52.5	37.8 to 56.7	37.8 to 52.5
MMY-AP4416FT8P	44	32	39.6 to 88.0	39.6 to 55.0	39.6 to 59.4	39.6 to 55.0
MMY-AP4616FT8P	46	32	41.4 to 92.0	41.4 to 57.5	41.4 to 62.1	41.4 to 57.5
MMY-AP4816FT8P	48	32	43.2 to 96.0	43.2 to 60.0	43.2 to 64.8	43.2 to 60.0
MMY-AP5016FT8P	50	32	45.0 to 100	45.0 to 62.5	45.0 to 67.5	45.0 to 62.5
MMY-AP5216FT8P	52	32	46.8 to 104	46.8 to 65.0	46.8 to 70.2	46.8 to 65.0
MMY-AP5416FT8P	54	32	48.6 to 108	48.6 to 67.5	48.6 to 72.9	48.6 to 67.5

M-HWM: Mid temperature Hot water module

H-HWM: High temperature Hot water module

H2,H4,H5: Height difference between indoor unit (Including HWM)

(*1): 20HP and 40HP: 90-185% 38HP: 90-190%

(*2): 20HP and 40HP: 90-125% 38HP: 90-130%

2. Specifications

Hot Water Module Specifications

Model				MMW-AP0481CHQ-E	MMW-AP0481CHQ-TR
Heating capacity *1			(kW)	14.0	14.0
Electrical characteristics	Power supply *2			1 phase 50 Hz 220-240 V	1 phase 50 Hz 220-240 V
	Running current (max)		(A)	17.5	17.5
	Power consumption (max)		(kW)	4.15	4.15
Appearance				Zinc hot dipping steel plate	Zinc hot dipping steel plate
Dimension	Unit	Height	(mm)	700	700
		Width	(mm)	900	900
		Depth (leg include)	(mm)	320 (400)	320 (400)
	Packed	Height	(mm)	790	790
		Width	(mm)	1,035	1,035
		Depth	(mm)	440	440
Weight	Unit		(kg)	100	100
	Packed		(kg)	105	105
Design Pressure	Refrigerant (R410A) side		(MPa)	3.73	3.73
	Refrigerant (R134a) side		(MPa)	4.15	4.15
	Water side		(MPa)	1.0	1.0
Heat exchanger (Water)				Plate type heat exchanger	Plate type heat exchanger
Heat exchanger (Cascade)				Plate type heat exchanger	Plate type heat exchanger
Heat-insulating material				Polyethylene foam + Polyurethane foam	Polyethylene foam + Polyurethane foam
Water flow rate	Standard		(L/min)	40	40
	Max - Min.		(L/min)	46 - 34	46 - 34
Water pressure loss (at standard water flow rate)			(kPa)	15	15
Control method				Wired remote controller (option)	Wired remote controller (option)
Operation range	Ambient	indoor	(°CDB)	5 - 32	5 - 32
		Allowable dew point	(°CWB)	23 or less	23 or less
			RH(%)	30 - 85	30 - 85
			Outdoor (at heating)	(°CDB)	-25 - 40 (*3)
		SHRM-e	(°CWB)	-25 - 28 (*3)	-25 - 28 (*3)
	Water outlet side		(°C)	50 - 82	50 - 82
Water filter				Strainer with Mesh30 to 40 (procured locally)	Strainer with Mesh30 to 40 (procured locally)
Connecting pipe	Water pipe	Inlet		R1-1/4	R1-1/4
		Outlet		R1-1/4	R1-1/4
	Refrigerant pipe	Gas pipe	(mm)	φ15.9 flare connection	φ15.9 flare connection
		Liquid pipe	(mm)	φ9.5 flare connection	φ9.5 flare connection
Drain nipple			(mm)	ID 15	ID 15
Sound pressure level *1			(dB(A))	44	44
Sound power level *1			(dB(A))	60	60
Installation place				Indoor	Indoor

*1 Rated conditions: entering condenser water temp. 60°C leaving condenser water temp. 65°C Outdoor air temp. 7°CDB / 6°CWB

The standard piping means that main pipe length is 5 m, branching pipe length is 2.5 m of branch piping connected with a 0 meter height.

*2 The source voltage must not fluctuate more than ±10%.

*3 Low ambient heating (-20°C or less) for extended periods of time is not allowed.

Remote controller able to be connected

Remote controller

RBC-AMT32E, RBC-AMS41E, RBC-AMS55E-ES/EN, RBC-AS41E

Schedule timer and central remote controller

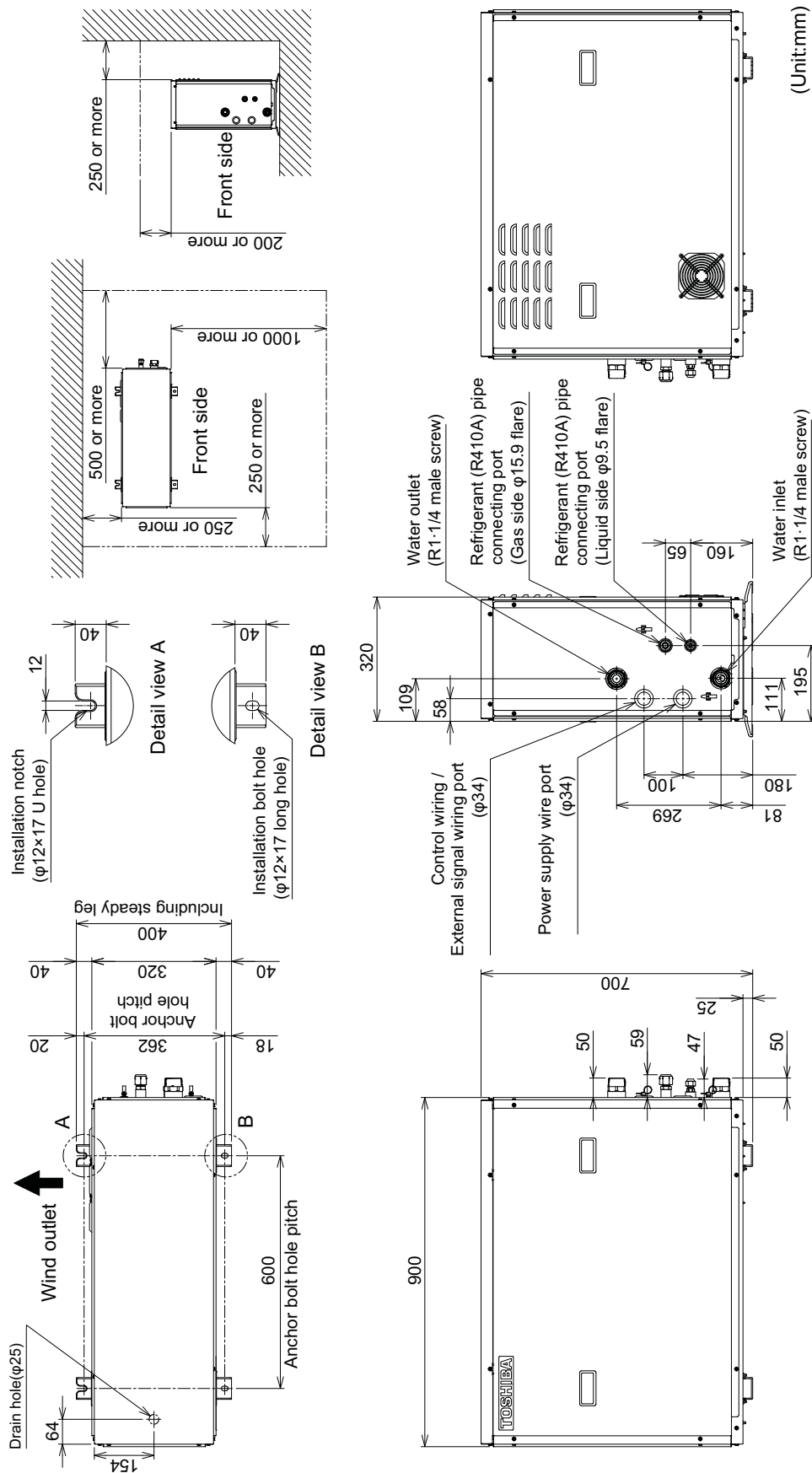
TCB-CC163TLE2

Application control

TCB-IFCB-4E2

3. Dimensional drawing

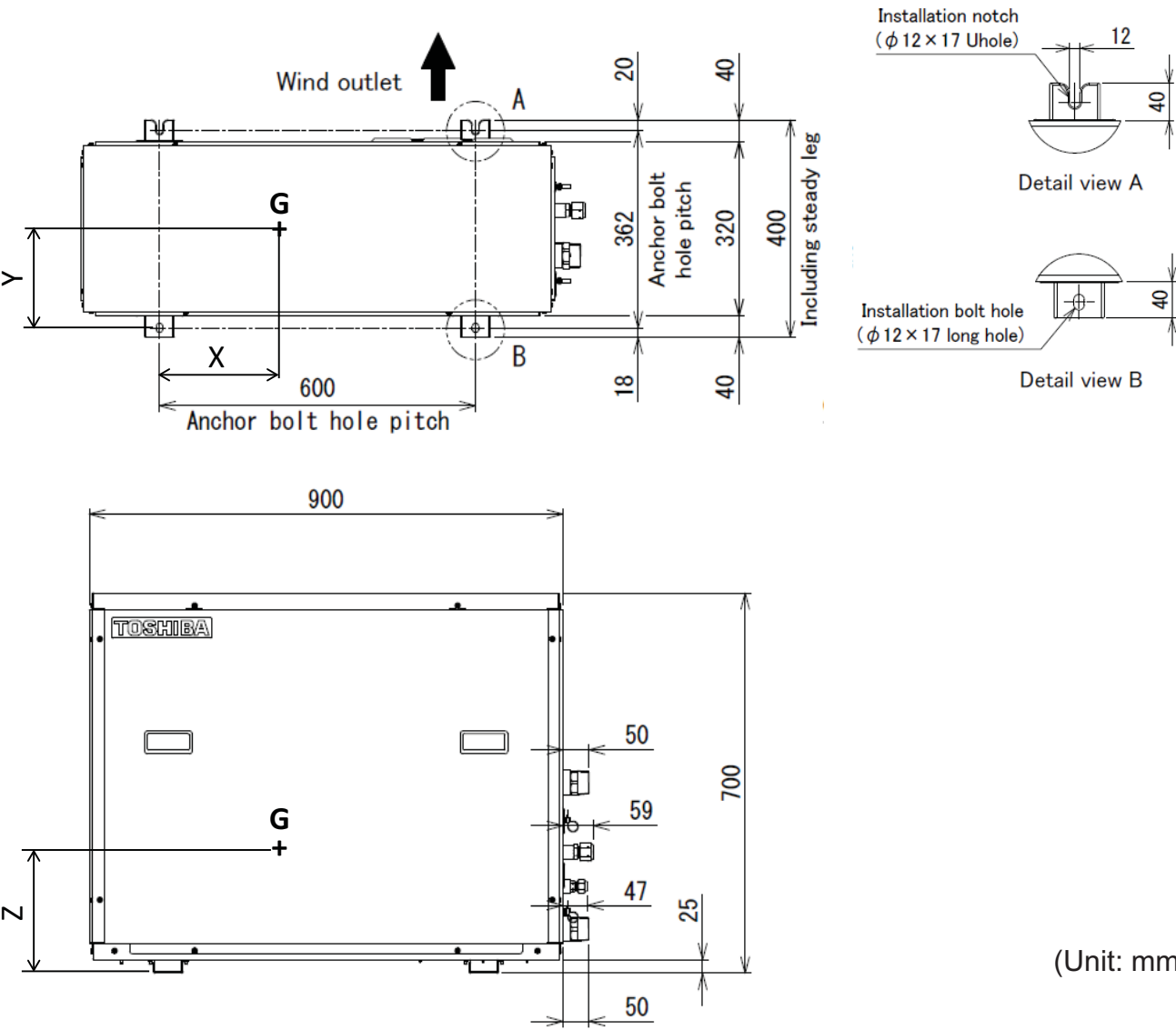
MMW-AP0481CHQ-E, MMW-AP0481CHQ-TR



4. Center of gravity

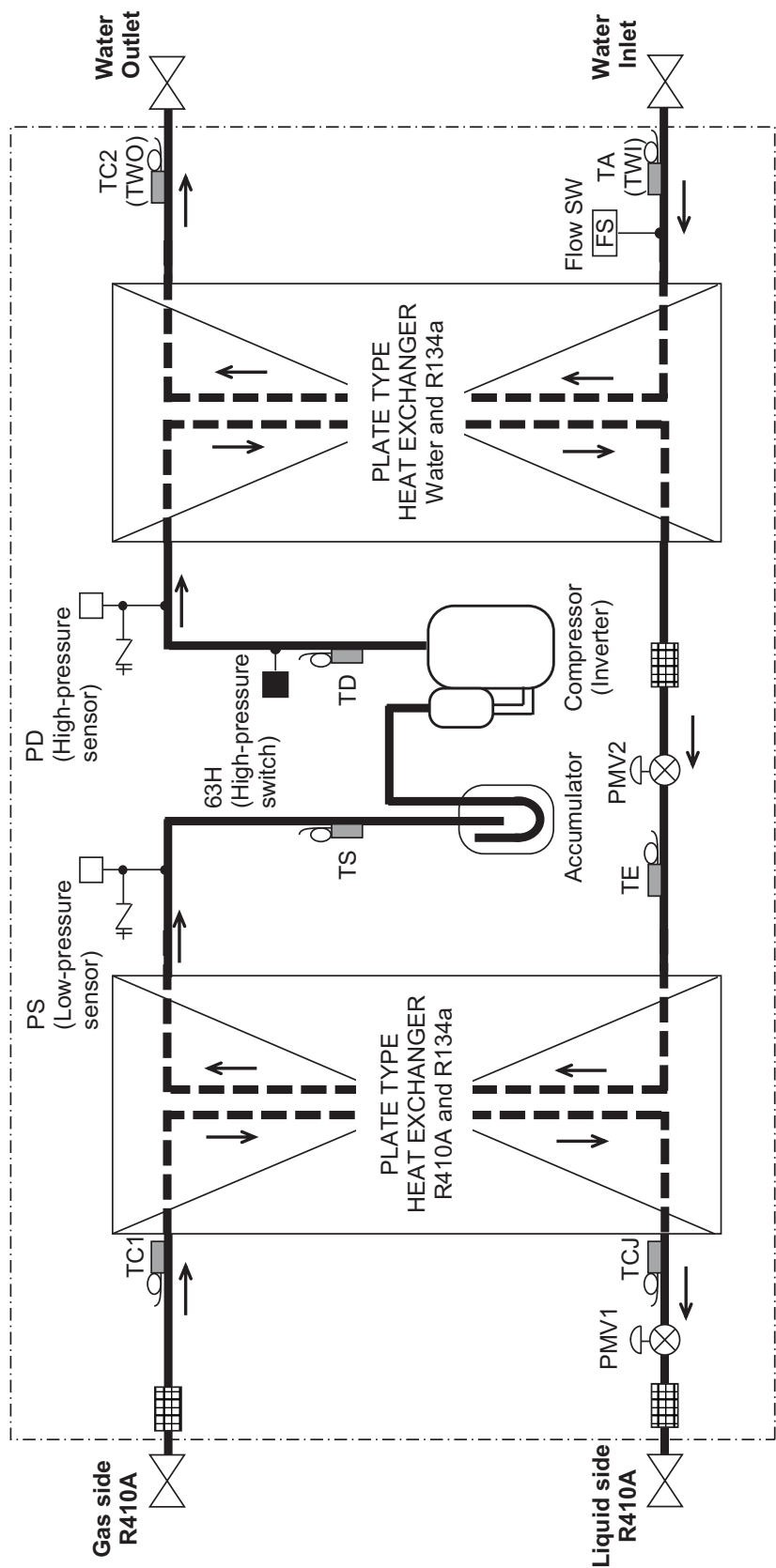
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Model type	X (mm)	Y (mm)	Z (mm)	Weight (kg)
MMW-AP0481CHQ-*	268	165	295	100



5. Refrigerant cycle diagram

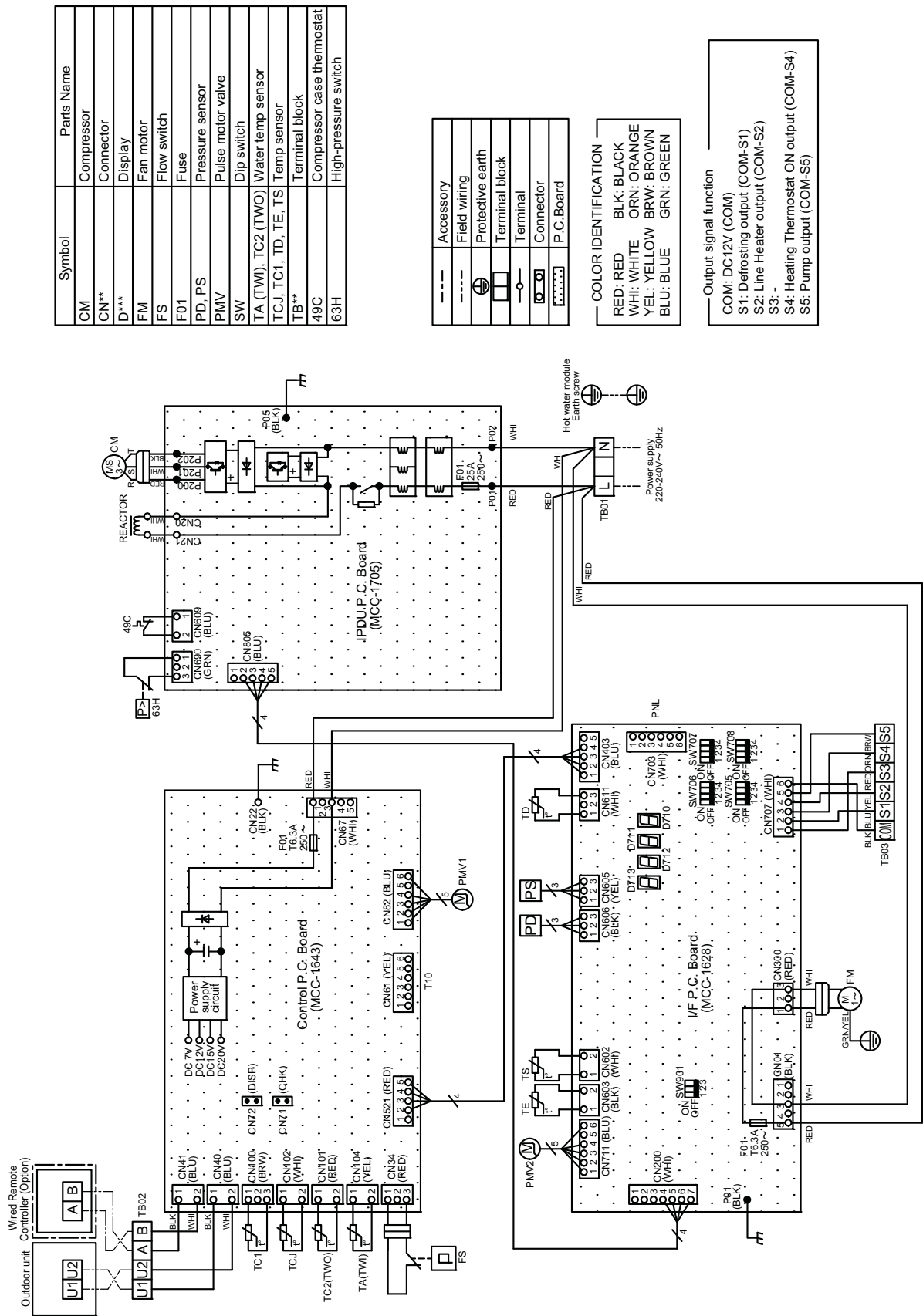
MMW-AP0481CHQ-E, MMW-AP0481CHQ-TR



Symbol		
		Temperature sensor
		Strainer
		Check joint

6. Wiring diagram

MMW-AP0481CHQ-E, MMW-AP0481CHQ-TR



7. Optional connector specifications

Function	Connector	Pin.No	Specifications	Remarks
HA	MCC-1643 / CN61	1	start/stop input	Start/stop input for HA (J01: In place / Removed = Pulse input (factory default) / Step input)
		2	0 V (COM)	-
		3	Remote controller disabling input	Enables / disables start / stop control via remote controller
		4	In-operation output	ON during operation (HA answerback signal)
		5	DC12 V (COM)	-
		6	Alarm output	ON while alarm ON
CHK Operation check	MCC-1643 / CN71	1	GND	Used for hot water module operation check (prescribed operational status output, such as R410A_PMV(PMV1) ON, to be generated without communication with outdoor unit or remote controller)
		2	Check mode input	
Outside trouble input	MCC-1628 / CN703	1	COM (DC12V)	Generates test code L30 and automatically shuts down air conditioner (only if condition persists for 1 minute)
		2	Outside trouble input	
		3	-	
		4	-	
		5	-	

Function	Connector	Pin.No	Specifications	Remarks
Option output	TB03	COM	DC12V	-
		S1	Defrosting output	ON while outdoor unit is defrosting
		S2	Heater output	-
		S3	-	-
		S4	Heating thermostat output	ON while heating thermostat ON (compressor ON)
		S5	Pump output	-

8. Electrical characteristics

Model	Nominal Voltage	Voltage Range		Power Supply	
	(V-Ph-Hz)	Min.	Max.	MCA	MOCP
MMW-AP0481CHQ-E	220 to 240 - 1 - 50	198	264	17.5	25.0
MMW-AP0481CHQ-TR	220 to 240 - 1 - 50	198	264	17.5	25.0

MCA : Minimum Circuit Amps

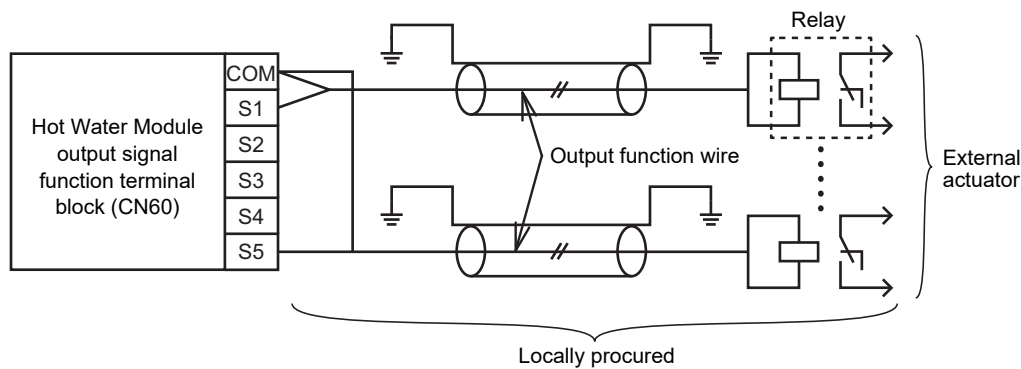
MOCP: Maximum Over current Protection (Amps)

9. External wiring diagram

Output signal function wiring

Connect the following output signals from the Hot Water Module.

Terminal block No.	Function	Comments
COM	DC12 V (COM)	Common for connector S2 ~ S5
S1	Defrosting output (COM-S1)	DC12 V Relay coil is less than 16 mA.
S2	Line heater output (COM-S2)	DC12 V Relay coil is less than 16 mA.
S3	-	-
S4	Heating thermostat ON output (COM-S4)	DC12 V Relay coil is less than 16 mA.
S5	Pump output (COM-S5)	DC12 V Relay coil is less than 16 mA.



NOTE

Auxiliary relays (locally procured) must be connected to output signal function wirings to allow connection to the Hot Water Module output signal functions. The maximum current output signal, from each of the output signal function wirings, is 16 mA. Please ensure the rated current of the relay coil is less than 16 mA to avoid damage to the Hot Water Module P.C. board.

▼Output function wire

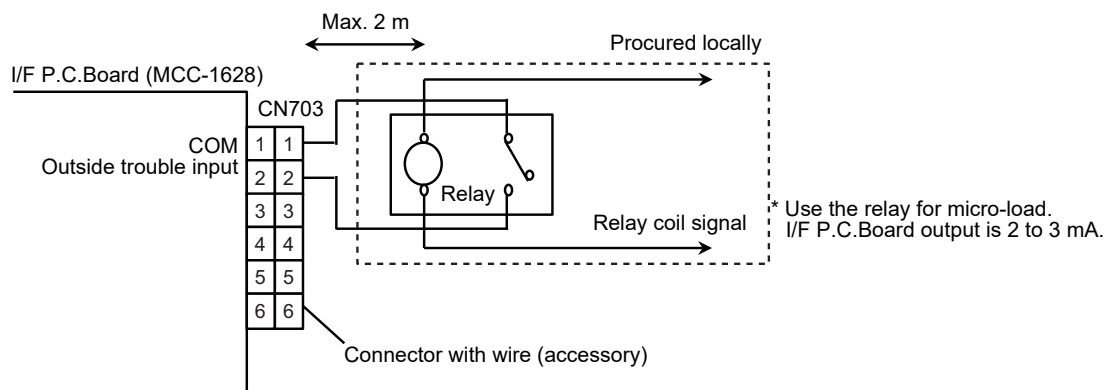
CAUTION

Output signal functions are separated from primary basic insulation.

- To prevent noise trouble, use 2-core shield wire.
- Determine the wire length between the hot water module output signal function terminal block and the relay up to 2 m.
- Locally procure and install protective devices such as the heater and pump.

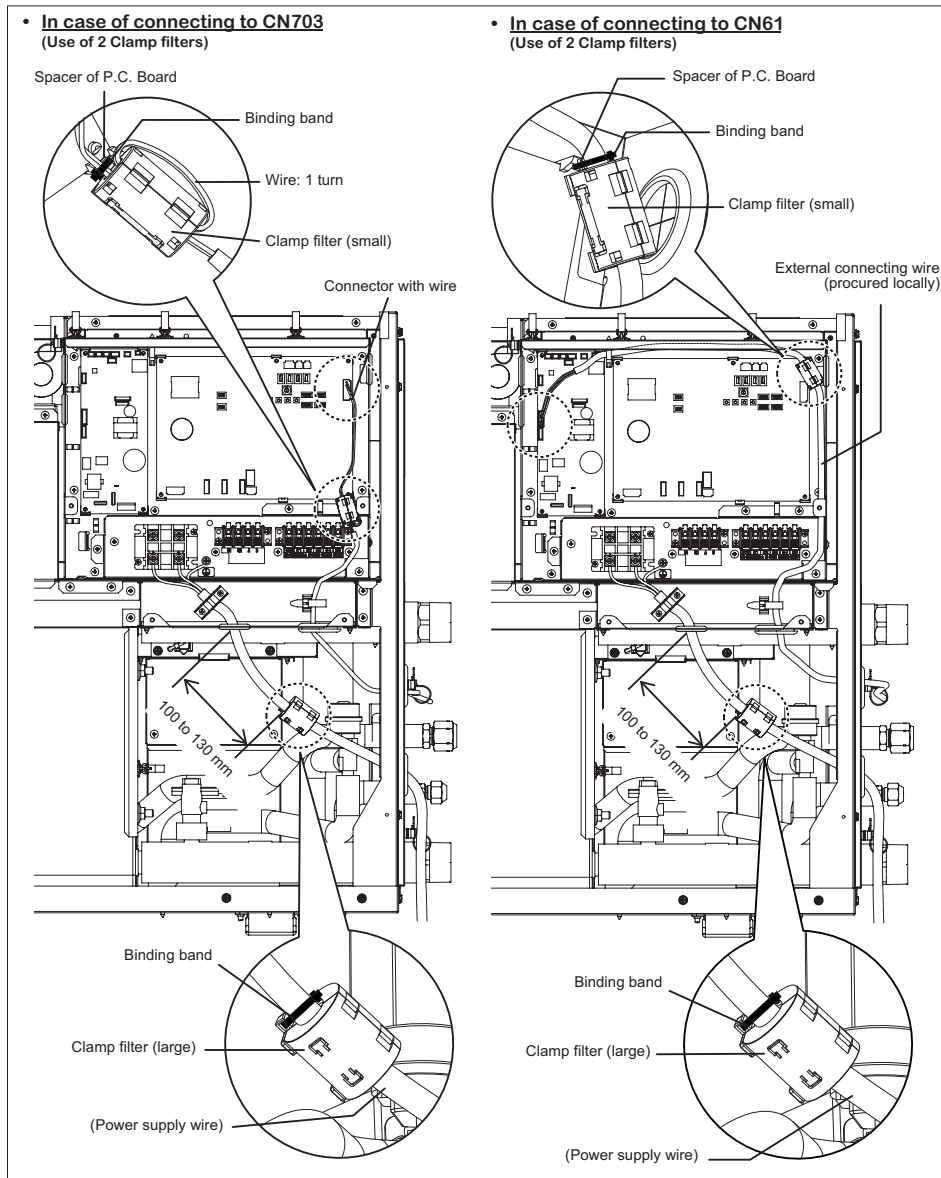
■Outside trouble input wiring

- In case of connecting the Relay (procured locally) for outside trouble input, connect a connector with wire (accessory) to CN703 on I/F P.C.Board (MCC-1628).
- After signal is input, 3 sec. later: Forced thermostat - OFF
1 min. later: Check code "L30" (Hot water module is locked)
(Interlock from outside)



▼ Clamp filter (accessory)

- In case of using external connecting to CN703 on I/F P.C.Board (MCC-1628) or CN61 on Control P.C.Board (MCC-1643), attach the clamp filters (accessory) as following.
- Fix a clamp filter to a spacer of P.C. Board or Power supply wire with a binding band.



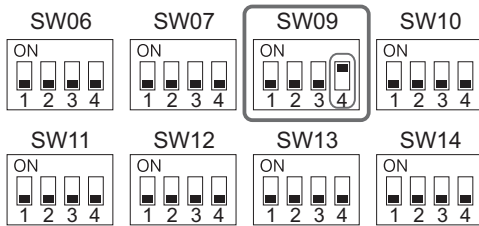
■ Address setup

Set up the addresses as per the Installation Manual supplied with the outdoor unit.

⚠ CAUTION

Set the DIP switch 4 of SW09 on the P.C. board of the header outdoor unit "ON". (Factory default is "OFF")
 VRF system will be stopped to avoid water freezing when the power supply is disconnected.

Interface P.C. board on the header outdoor unit

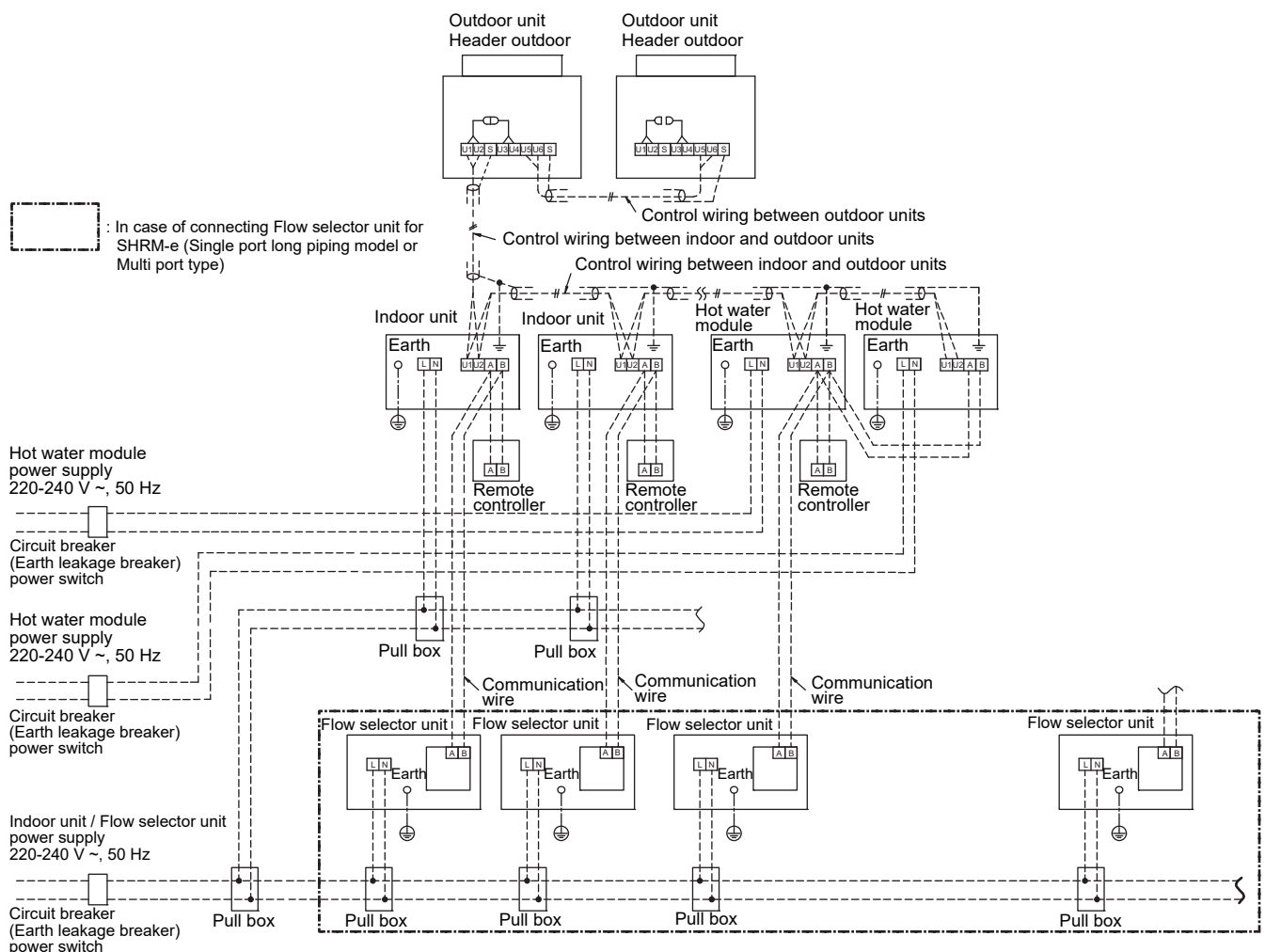


Wiring between indoor (including Hot Water Module) and outdoor units

NOTE

- An outdoor unit connected with control wiring between indoor (including hot water module) and outdoor units wire becomes automatically the header unit.
- Do not turn off the circuit breaker of the Hot Water Module when the circuit breaker of the system (outdoor unit) is set to the ON position.
- It becomes a cause of a trouble.

▼Wiring example



▼ Power supply

- For the power supply of the hot water module, prepare the exclusive power supply separated from that of the outdoor unit and other indoor units.
- Power supply wire specification: Cable 3-core, **in conformity with 60245 IEC 57.**

Power supply	220 V – 240 V ~, 50 Hz
Maximum running current	17.5 A
Recommended field fuse	25 A

Control wiring, Central controller wiring

- 2-core with non-polarity wires are used for the Control wiring between indoor unit (including hot water module) and outdoor unit and Central controller wiring.
- To prevent noise trouble, use 2-core shield wire.
- The length of the communication line means the total length of the inter-unit wire length between indoor (including hot water module) and outdoor units added with the central control system wire length.

▼ Communication line

Control wiring between indoor units (including hot water module), and outdoor unit (2-core shield wire)	Wire size	(Up to 1000 m) 1.25 mm ² (Up to 2000 m) 2.0 mm ²
Central control line wiring (2-core shield wire)		

Remote controller wiring

- 2-core with non-polarity wire is used for wiring of the remote controller wiring and group remote controllers wiring.

Remote controller wiring, remote controller inter-unit wiring	Wire size: 0.5 mm ² to 2.0 mm ²
---------------------------------------------------------------	-------------------------------------------------------

Connecting to SHRM-e

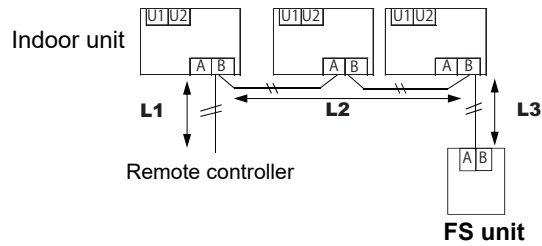
Total wire length between indoor unit and Flow selector unit (L2+L3)	Up to 200 m
Total wire length between remote controller and Flow selector unit (L1+L2+L3)	Up to 300 m
Maximum wire length of remote controller (L1)	Up to 300 m

Output signal function wiring

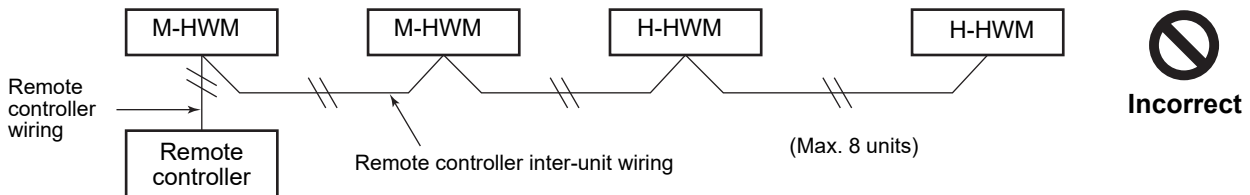
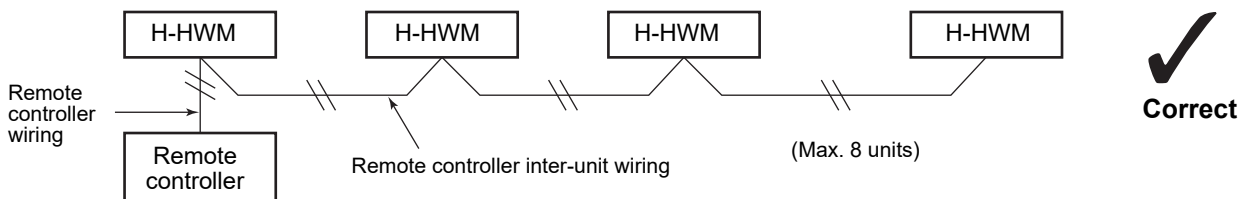
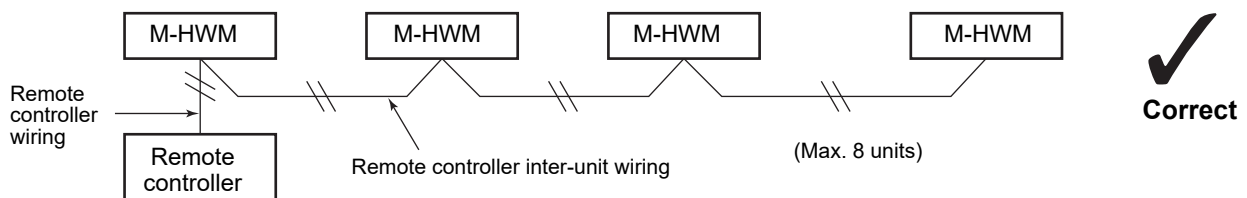
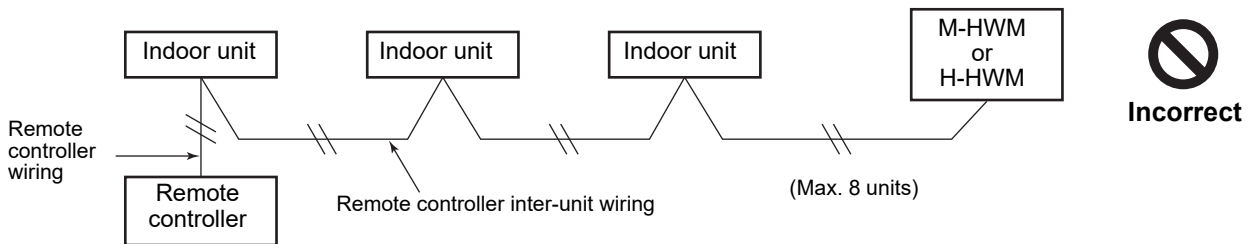
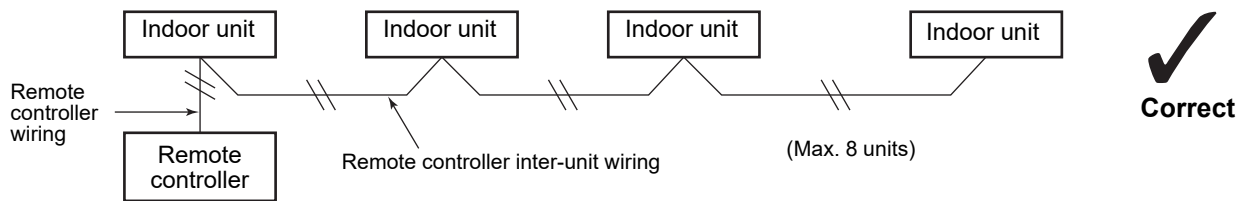
- To prevent noise trouble, use 2-core shield wire.

Output function wiring (2-core shield wire)	Wire size	(up to 2 m) 0.5 mm ²
---------------------------------------------	-----------	---------------------------------

Remote controller wiring



M-HWM: Mid temperature Hot Water Module
H-HWM: High temperature Hot Water Module



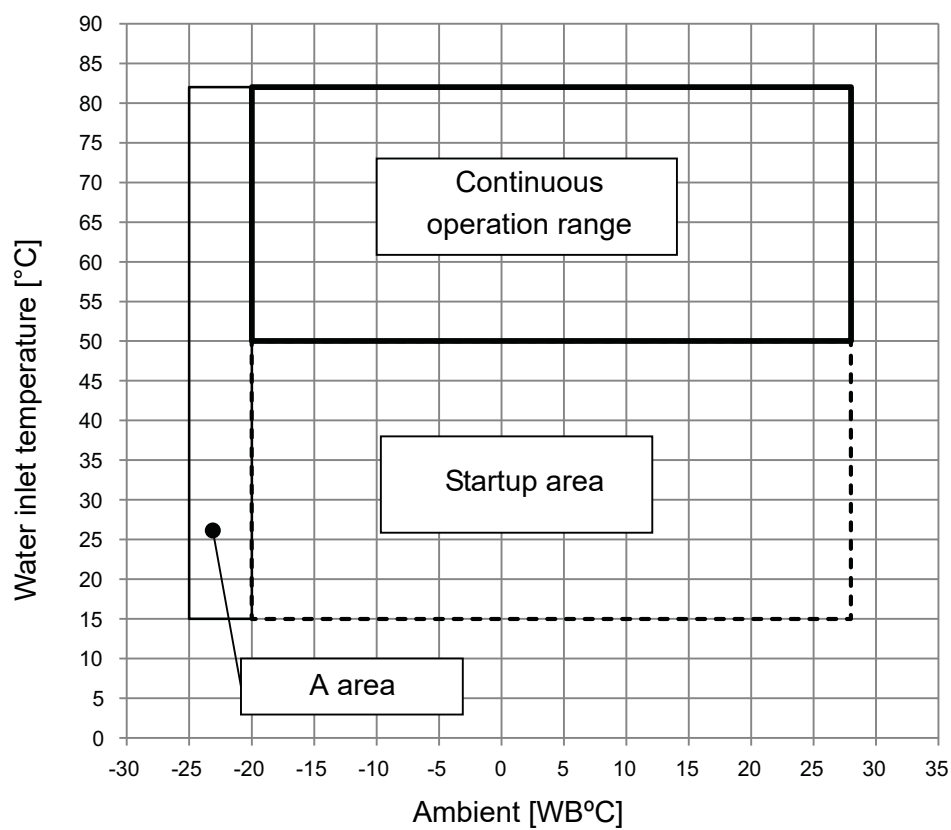
(*): In the case of multiple refrigerant systems

NOTE

It is not possible to connect any Hot Water Modules and any indoor units together for group control.
It is not possible to connect M-HWM and H-HWM together for group control.

10. Water side characteristics

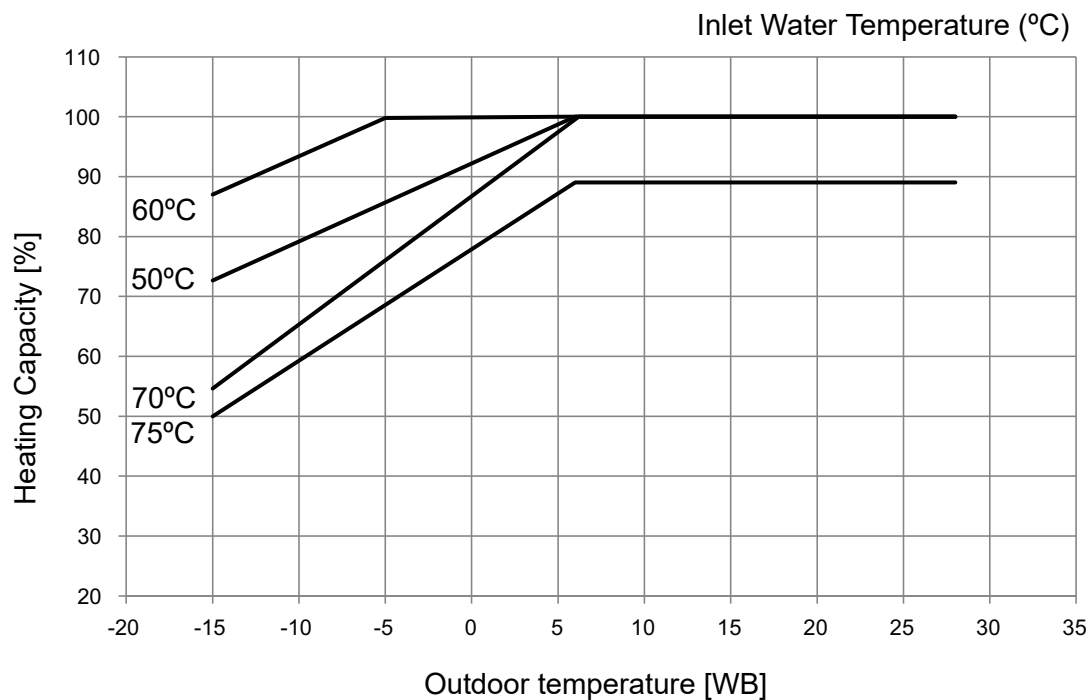
High temperature Hot Water Module operation temperature range



A area: Low ambient heating (-20°C or less) for extended periods of time is not allowed.

Hot Water Module capacity characteristics

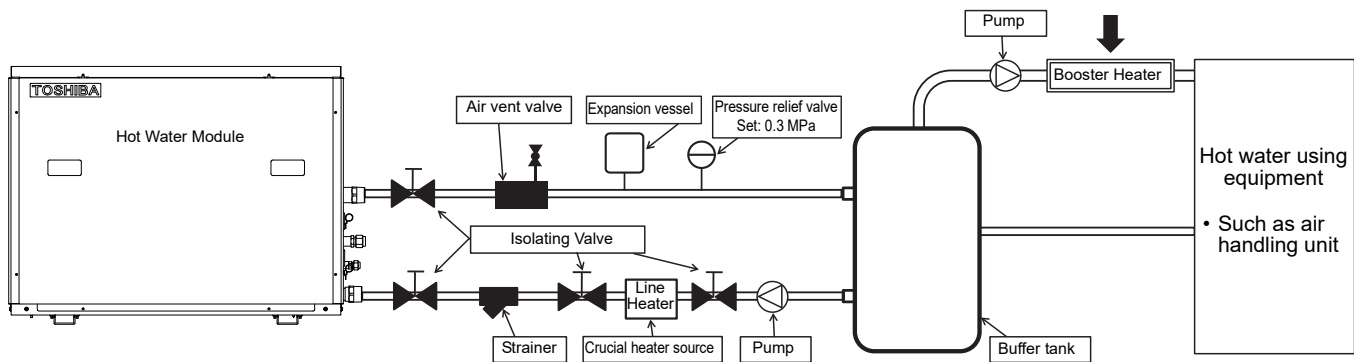
Correction by temperature (Estimated performance without defrost)



In case of outside air temperature is 27°C DB or more and the total operating capacity of M-HWM and H-HWM is less than 5 horsepower, the heating capacity may be extremely decreased.

In case of outside air temperature is 27°C DB or more and the operation capacity is small at the simultaneous operation, the cooling and the heating capacity may decrease.

Booster Heater capacity simple selection table
Water piping installation example



Booster Heater capacity (%: Hot Water Module rated capacity ratio) simple selection table

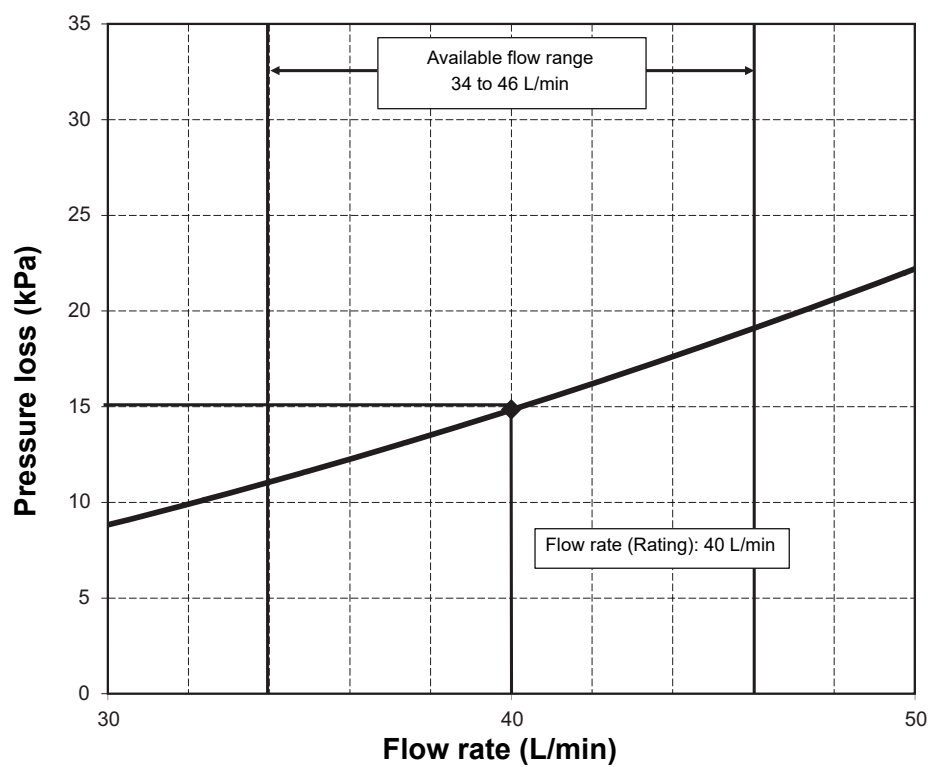
Outdoor temperature WB °C	Remote controller set temperature °C			
	50 to 60	60 to 70	70 to 75	more than 75
less than -15	20	30	30	50
-15 to -5	10	20	20	50
-5 to 6	-	10	10	50
more than 6	-	-	10	50

Characteristics of Hot Water Module flow rate and pressure loss

The following graph shows the range of flow rates used for the Hot Water Module, and the characteristic pressure losses. Use this as an aid in the local pump procurement process.

048 type

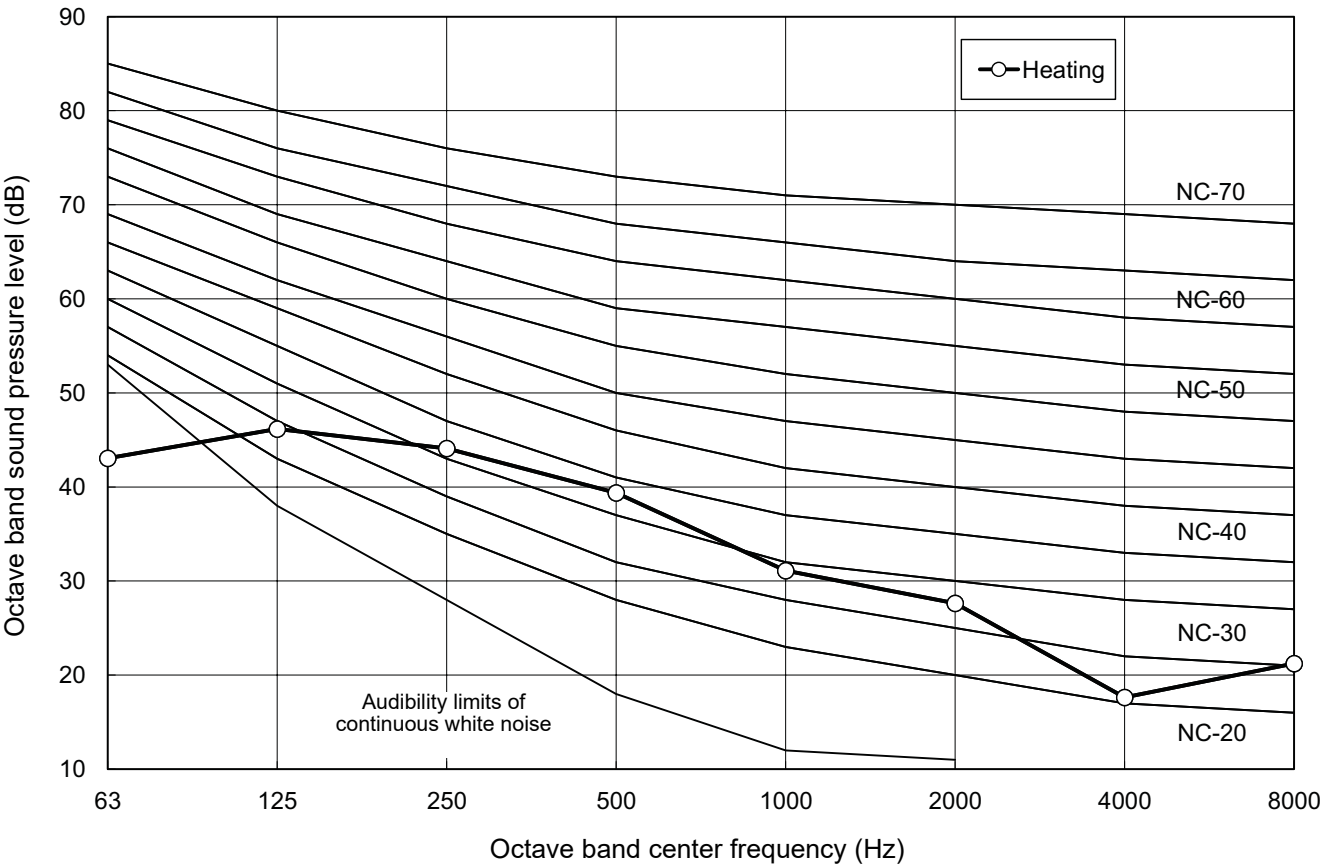
	Min.	Rated	Max.
Water flow rate (L/min)	34	40	46
Pressure loss (kPa)	12	15	18.5



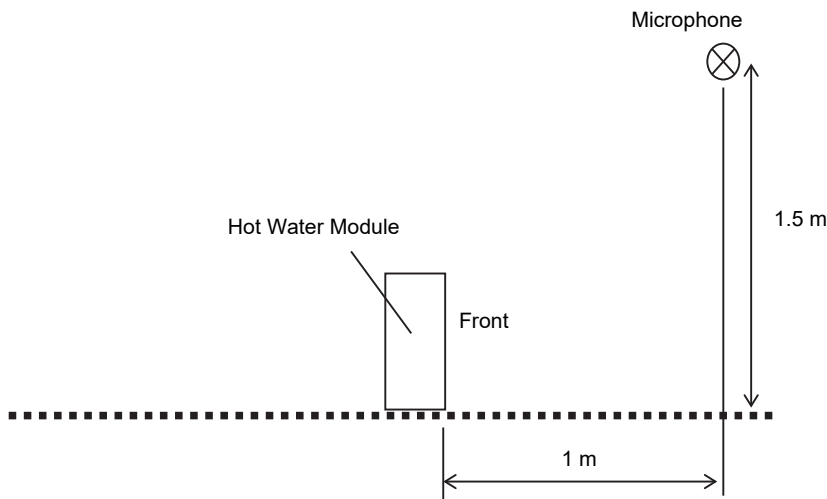
11. Sound data

Sound characteristics of Hot Water Module
MMW-AP0481CHQ-E/TR

Sound pressure level dB(A)	Heating
	44



Measuring location



12. Caution of installation

Water piping

WARNING

- Install water pipes according to the regulations of respective countries.
 - Install water pipes in the freeze-free place.
 - Make sure that water pipes have sufficient pressure resistance. The design pressure is 1.0 MPa.
-

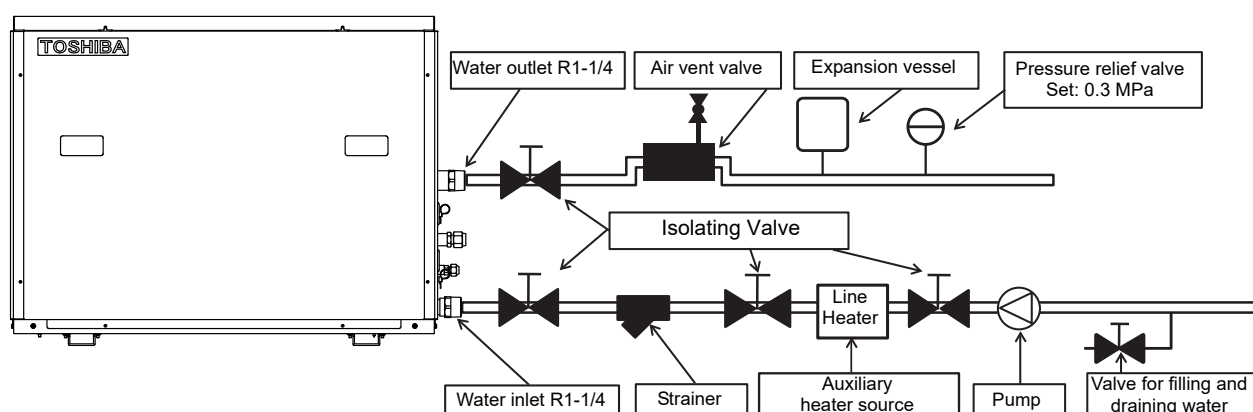
CAUTION

- Do not use zinc plated water pipes. When steel pipes are used, insulate both ends of the pipes.
 - Copper pipes are recommended.
 - The water to be used must meet the water quality standard specified in EN directive 98/83 EC.
After the vacuuming is completed, carry out the following procedure before adding refrigerant.
 - Plate heat exchanger may explode because the water in the plate heat exchanger frozen.
To avoid this phenomenon, add refrigerant before carrying out a water supply to the water pipe system of the Hot Water Module.
-

Water piping and line heater installation

- Make the piping route a closed circuit. (An open water circuit may cause a failure.)
- Before a long period of none use, purge the water out of the pipes and thoroughly let them dry.
- Do not add brine to the circulating water.
- Do not use the water used for the unit for drinking or food manufacturing.
- To ensure easy maintenance, inspection, and replacement of the unit, use a proper joint, valve, etc. (procured locally) on the water inlet and outlet port.
- Be sure to install a strainer with 30 to 40 meshes (procured locally) on the water inlet pipe. If a strainer is not installed, this may cause impaired performance, or damage to the plate heat exchanger from freezing.
- Install a suitable air vent (procured locally) on the water pipe. After sending water through the pipe, be sure to vent the excess air.
- To avoid water leak, wrap some sealing tape around the screw part.
- Water pipes can get very hot, depending on the preset temperature. Wrap the water pipes with heat insulation (procured locally) to prevent burns.
- Be sure to install the line heater (procured locally) on the water inlet side. In addition, position it within 5 m of the water inlet pipe of the Hot Water Module.
- Follow the table below to select a line heater (procured locally) within the range of 40 to 50% of the Hot Water Module's rated capacity.

Hot water module model name	Capacity of line heater (kW)
MMW-AP0481CHQ-E	5.8 ~ 7.2

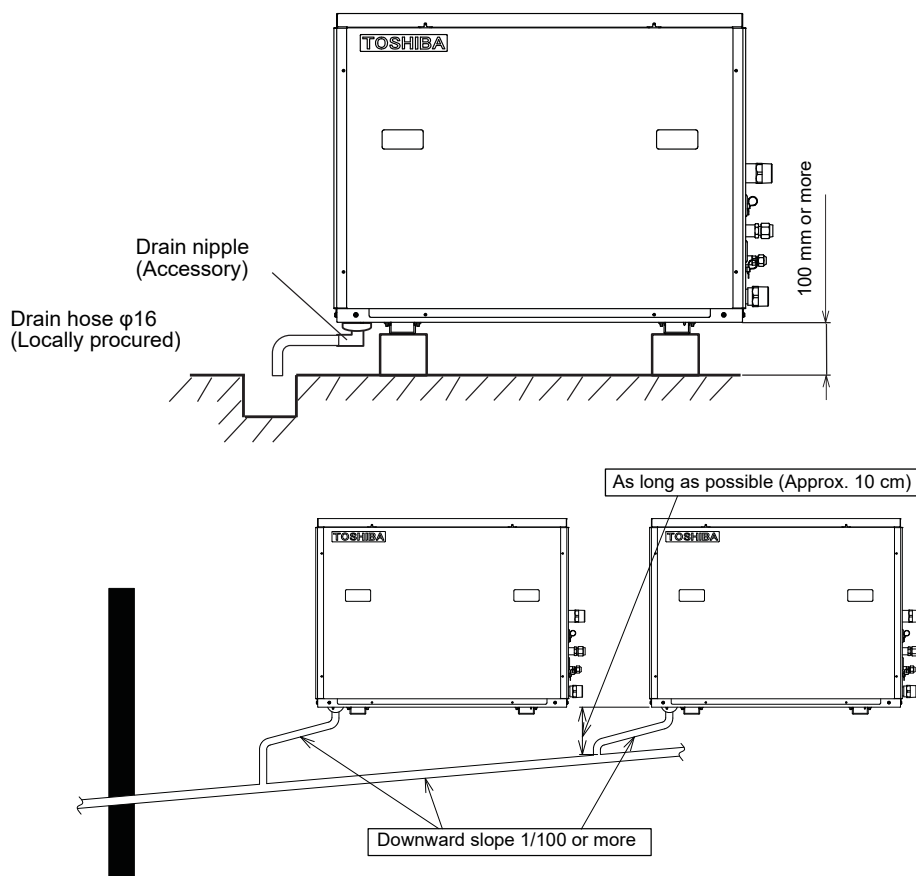


Pipe size, material and insulator

The following specification for piping work and insulating process are procured locally.

Model		MMW-	AP048
Connecting pipe (unit side)	Water pipe	Inlet	R1 - 1/4
		Outlet	R1 - 1/4
Connecting pipes material			Copper pipes are recommended
Insulator			Formed polyethylene foam, thickness: 10 mm or more

Drain piping



- Connect the drain hose (locally procured) size inner diameter $\phi 16$ to the drain nipple (accessory).
- Provide the indoor drain piping with proper heat insulation.
- Provide the area where the pipe connects to the indoor unit with proper heat insulation. Improper heat insulation will cause condensation to form.
- The drain pipe must be sloping downward (at an angle of 1/100 or more), and do not run the pipe up and down (arched shape) or allow it to form traps. Doing so may cause abnormal sounds.
- Install the collective piping as shown in the following figure.
- Do not provide any air vents. Otherwise, the drain water will spout, causing water to leak.
- Do not allow any force to be applied to the connection area with the drain pipe.

Selection of installation place

Avoid installing in the following places

Select a location for the indoor unit where the cool or warm air will circulate evenly.

Avoid installation in the following kinds of locations.

- Saline area (coastal area)
- Locations with acidic or alkaline atmospheres (such as areas with hot springs, factories where chemicals or pharmaceuticals are made and places where the exhaust air from combustion appliances will be sucked into the unit).
Doing so may cause the heat exchanger and other parts to become corroded.
- Locations with atmospheres with mist of cutting oil or other types of machine oil.
Doing so may cause the heat exchanger to become corroded, mists caused by the blockage of the heat exchanger to be generated, the plastic parts to be damaged, the heat insulators to peel off, and other such problems to result.
- Locations where vapors from food oils are formed (such as kitchens where food oils are used).
The plastic parts to be damaged, and other such problems to result.
- Locations where an in-house power generator is used for the power supply.
The power line frequency and voltage may fluctuate, and the Hot Water Module may not work properly as a result.
- On truck cranes, ships or other moving conveyances.
- The Hot Water Module must not be used for special applications (such as for storing food, plants, precision instruments or art works).
(The quality of the items stored may be degraded.)
- Locations where high frequencies are generated (by inverter equipment, in-house power generators, medical equipment or communication equipment).
(Malfunctioning or control trouble in the Hot Water Module or noise may adversely affect the equipment's operation.)
- Locations where there is anything under the unit installed that would be compromised by wetness.
(If the drain has become blocked or when the humidity is over 85%, condensation from the Hot Water Module will drip, possibly causing damage to anything underneath.)
- In the case of the wireless type of system, rooms with the inverter type of fluorescent lighting or locations exposed to direct sunlight.
(The signals from the wireless remote controller may not be sensed.)
- Locations where organic solvents are being used.
- The Hot Water Module cannot be used for liquefied carbonic acid cooling or in chemical plants.
- Location near doors or windows where the Hot Water Module may come into contact with high-temperature, high humidity outdoor air.
(Condensation may occur as a result.)
- Locations where special sprays are used frequently.
- Places where iron or other metal dust is present. If iron or other metal dust adheres to or collects on the interior of the Hot Water Module, it may spontaneously combust and start a fire.
- Locations such as living rooms and bedrooms where you can easily be bothered by noise. Noise may become a problem.

CAUTION

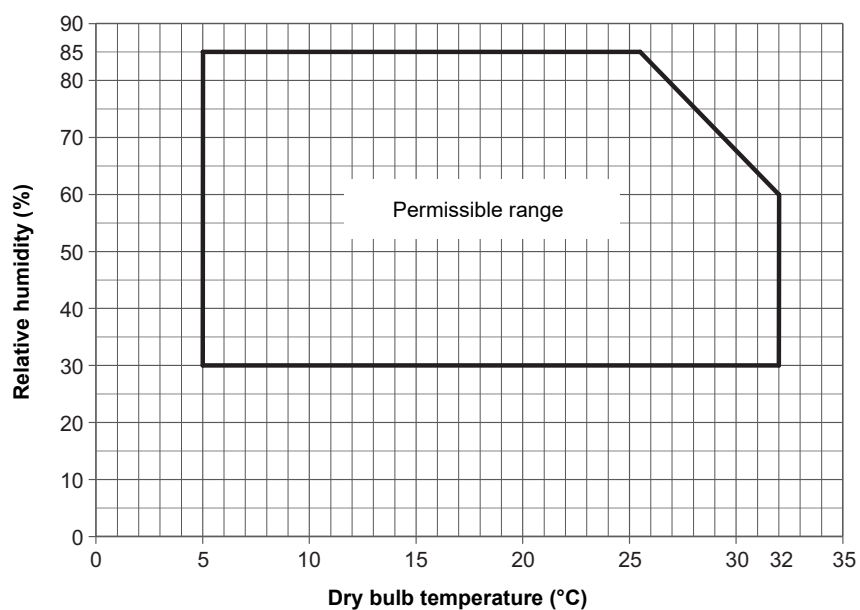
- Do not install Hot Water Module in a place where water freezes.
- Do not install the Hot Water Module in a place where combustible gas may leak.
- Do not install the Hot Water Module in a place exposed to rain or water.
- Do not install the Hot Water Module near equipment which generates heat.
- Do not install the Hot Water Module to a movable object.
- Do not install the Hot Water Module in a place exposed to vibration.
- The Hot Water Module must be installed in accordance with national wiring regulation.
- The Hot Water Module must not be installed in a high humidity condition area.
- The Hot Water Module must not be installed in a high dusty area.

Installation atmosphere

Installation atmosphere of the unit is as follows. Be careful of installation atmosphere.

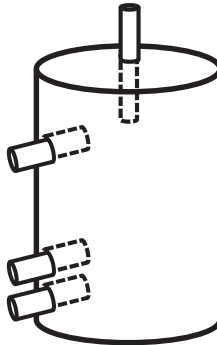
It becomes a cause of failure of a product by dewing or freezing.

Installation atmosphere	Dry-bulb temp. (°C)	5 to 32
	Wet-bulb temp. (°C)	24 (Max.)
	RH (%)	30 to 85
	Allowable dew point (°C Wet-bulb temp)	23 or less



Buffer Tank Installation

A buffer tank must be installed in order to stabilize the temperature of the water supplied when using a Hot Water Module to the heating equipment such as a radiator or floor heating.

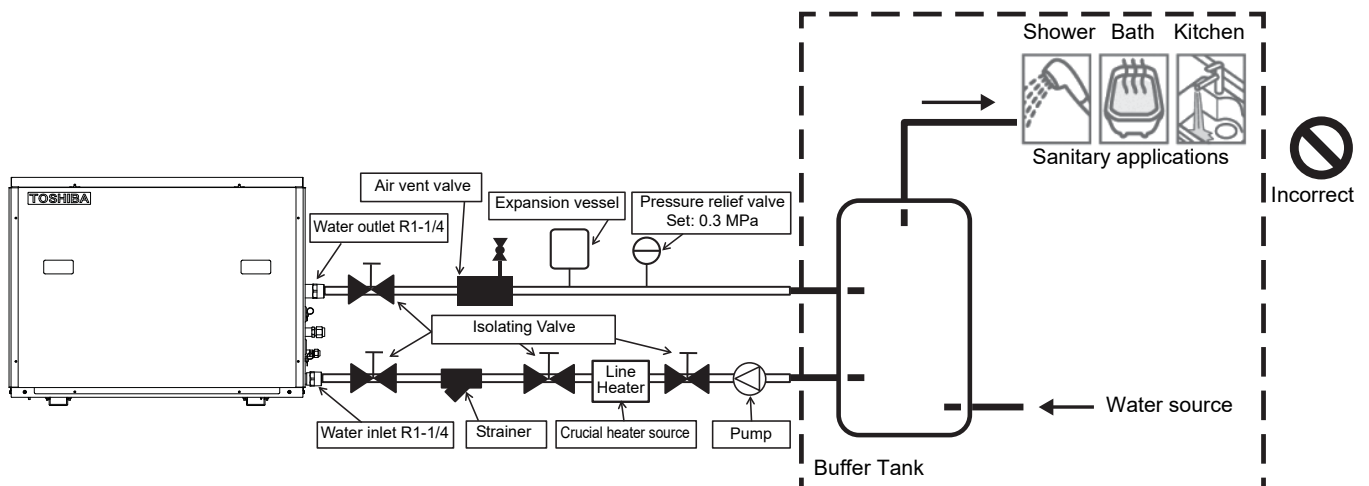
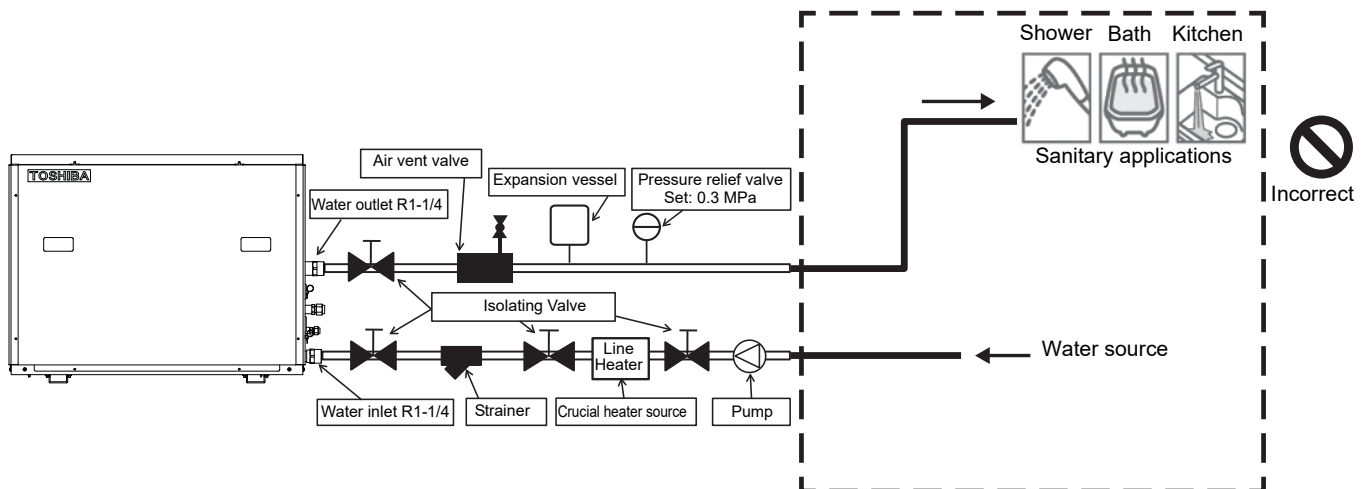
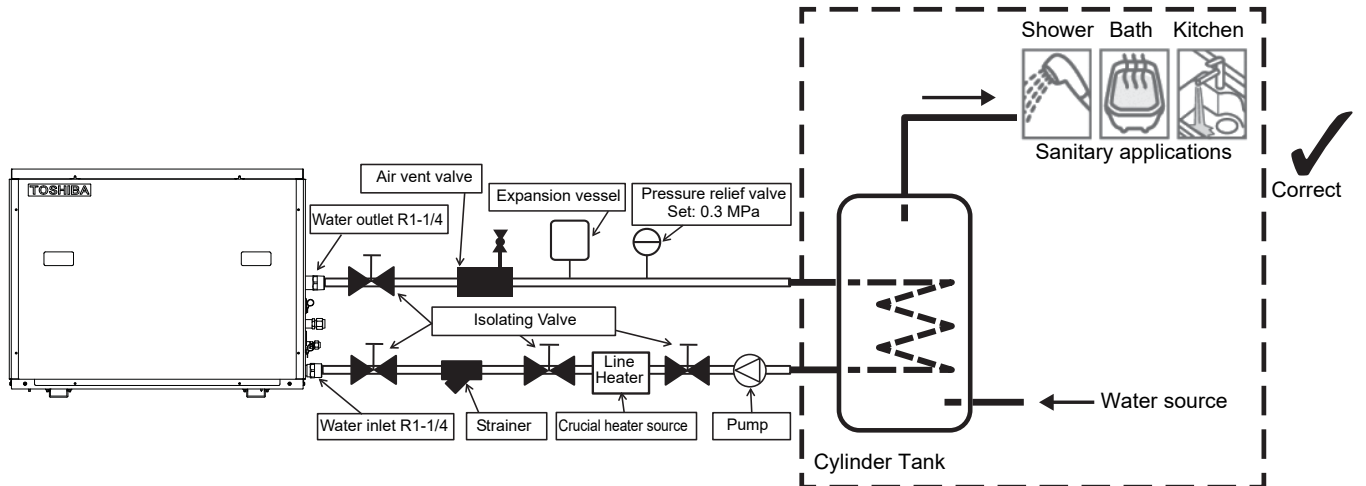


Buffer tank for space heating

Cylinder Tank Installation (For sanitary applications)

A cylinder tank must be installed in order to protect for Hot Water Module when used in sanitary applications. For Hot water module protection, always install a cylinder tank.

If the cylinder tank is not installed, the temperature of the water does not rise, or problems occurs that do not come up with warm air from the air conditioner, which is connected to the same refrigerant piping.



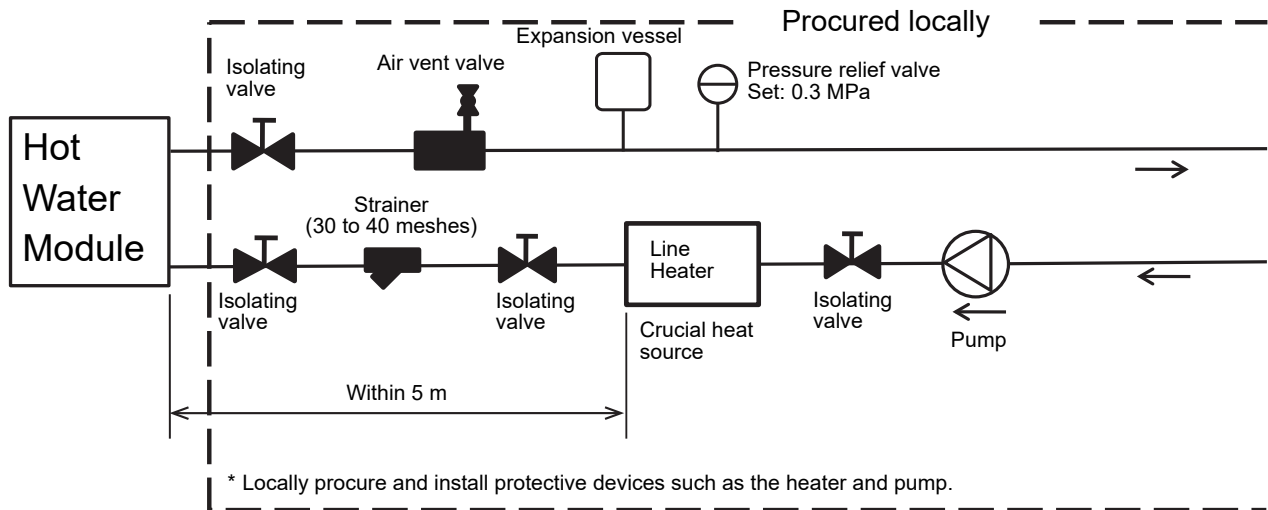
External (Support) Line Heater Installations

Please be sure to install the line heater (procured locally) when HWM is installed a water freezes environment. Not installing a heater causes problems such as the HWM water heat exchanger freezing and loss of heating ability.

[1] Install the heater within 5 m of the water pipe between the Hot Water Module and the water pump, and 5 m of the HWM pipe connections.

[2] Select a heater with a capacity of 40 to 50% of the rated capacity of the HWM.

[3] To prevent fires caused by overheating, use a heater with safeguards such as a fuse and temperature type protective switch.



High temperature Hot Water Module Engineering Data Book

Model name:

MMW-AP__1CHQ-E

November, 2019 Second Edition

Toshiba Carrier Corporation