

Control Systems

Technical Data Book

Control system for DVM CHILLER



Model : MCM-A00N (Module control)

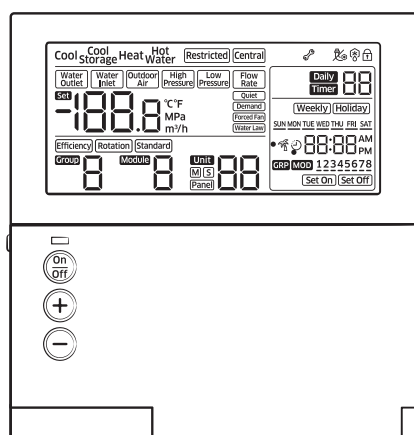
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DVM CHILLER control system

MCM-A00N

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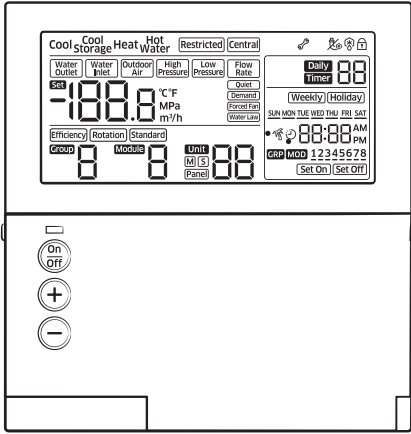


I DVM CHILLER control system

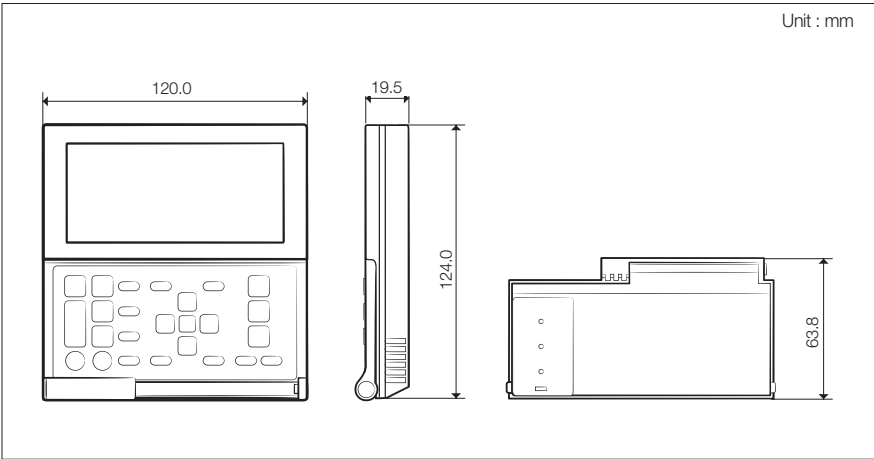
1. Module control

 MCM-A00N

1) Features



- DVM CHILLER On/Off control (Module / Group)
- Operation mode, water outlet temperature setting
- Optional operation setting
- Module/Group setting
- Weekly operation schedule setting



2) Product specification

Power Supply	DC12V
Power Consumption	2W
Operating Temperature range	0°C~40°C
Operating Humidity range	30%RH~90%RH
Communication	2-wire PLC
Max. Communication length	200m
Max. Number of connection	16 DVM CHILLER units

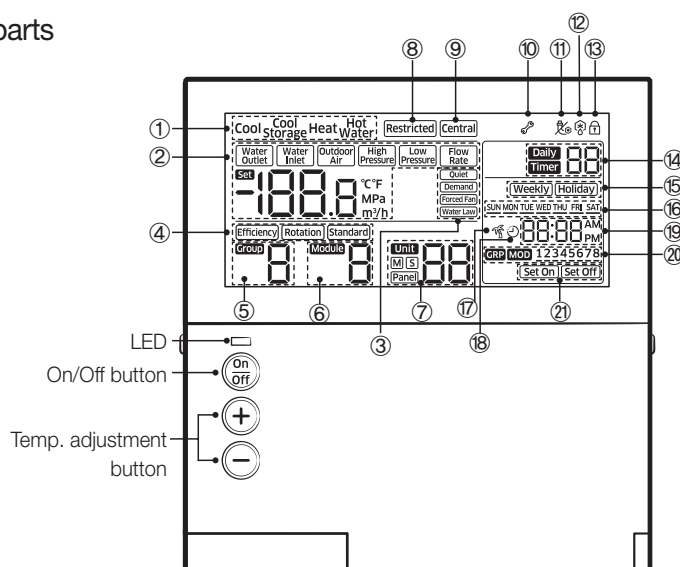
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1. Module control

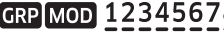
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3) Description of parts

(1) Display



No.	Display	Function
①	CoolCoolHeatHot StorageWaterWater	Displays the operation mode.
②	Water Outlet Water Inlet Outdoor Air High Pressure Low Pressure Flow Rate Set 18.8 °C/°F MPa m³/h	- Displays the set or current water temperature (°C, °F). NOTE - Press button to display the set water temperature for 3 seconds. - The default is the current water temperature, and it can be changed into the set water temperature in the service setting mode. - The display will show Lo when the value can be displayed (-199 ~ 199) or show HI when it cannot be displayed. - Displays the current temperature (°C, °F) of water inlet or outdoor air. - Displays the current high or low pressure (MPa) of refrigerant. - Displays the current water flow rate (m³/h).
③	Quiet Demand Forced Fan Water Law	Displays the selected applied operation.
④	EfficiencyRotationStandard	Displays the operation pattern by each module and group.
⑤	Group8	Displays the group from 1 to 4.
⑥	Module8	Displays the module from 1 to 8.
⑦	Unit M S Panel 88	- Displays the unit from 0 to 15 (maximum 16). - Displays Master or Slave. - Displayed when setting the Panel control function from a certain unit. - Panel control function is to set the unit to control the operation itself, so the operation cannot be controlled from the module control if this function is set.
⑧	Restricted	- Displayed when button input is restricted. - Restricted display will appear when the buttons are restricted due to central control or when a combined operation cannot be performed. NOTE - The module control will be restricted in the following cases. - Example1 : Displayed when pressing button in the central control. - Example2 : Displayed when setting the button lock function and then pressing button in the service mode

No.	Display	Function
⑨		- Displayed when setting the central control. NOTE - Central display will appear when the module control is controlled by the central control room of the building or by the upper level control such as a central control or a DMS etc. - In this case, timer and all functions will be operated by the upper level control.
⑩		- Displayed when an error occurs in a product or a module control. NOTE - Blinked when an error occurs in a product or a module control, followed by the error code. - It will disappear when all errors is solved.
⑪		Displayed when a pump operates automatically to keep the pipes from freezing.
⑫		- Displayed when the defrost function operates. NOTE - Defrost function is to remove frost on the outdoor unit during operating the heat mode.
⑬		- Displayed when selecting the button lock function. NOTE - To lock the buttons of the module control, press  button.
⑭		Displays the number of daily or entire timers.
⑮		Displays weekly timer or holiday setting.
⑯		Displayed days of week while setting weekly or daily timer or displaying the set timer.
⑰		Displayed when the summer time function is set.
⑱		- Displayed when setting the off timer for the entire DVM CHILLER in the additional function. - Time for the off timer function can be set to maximum 23 hours. NOTE - The current time will be displayed if there is more than an hour until the set time. - The remaining time will be displayed and the off timer display will appear if there is less than an hour until the set time.
⑲		Displays the current time or the set time.
⑳		Displayed when selecting a group or a module while setting the weekly timer. (Group : 1 ~ 4, Module : 1 ~ 8)
㉑		Displayed Set on or Set off while setting or displaying timer.

☑ Note

- ◆ If you set the input method as external contract control in the option setting of DVM CHILLER, the module control cannot control the units.
 - When pressing  On Off, , or , button on the module control, the displays will appear on the display but the DVM CHILLER will not operate.
- ◆ The module control cannot sense the indoor temperature.
- ◆ The module control does not control the midnight electricity's time or the cool storage tank.

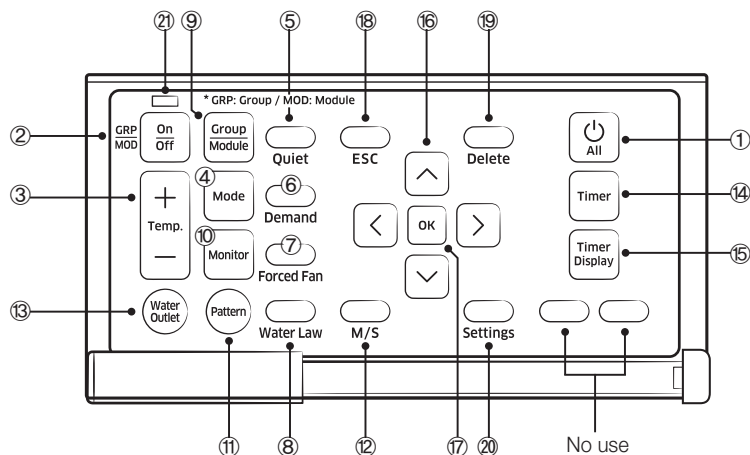
I DVM CHILLER control system

1. Module control

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3) Description of parts

(2) Buttons



Classification		Indication		Function
Start/ Stop	①		All start/stop button	- Turns on or off all the DVM CHILLERS. - You can turn on or off all the connected modules and groups. NOTE - When turning off all units and turn them back on, the units will operate in a previously selected mode.
	②		On/Off button	- Turns on or off a group or a module individually. - When a module or a group is turned off, temperature or mode displays will not appear. NOTE - When turning off a module or a group and turn it back on, each module or group will operate in a previously selected mode.
Basic operation	③		Temp. adjustment button	- Adjusts the desired water temperature. NOTE - For celsius, the set water temperature can be adjusted by 1, 0.5, or 0.1 °C depending on the set value in the service mode. For fahrenheit, it can be adjusted by 1 °F. - If you press and hold the button, it will be adjusted by 1 °C/1 °F.
	④		Operation mode button	Selects the desired operation mode.
Applied operation	⑤		Quiet button	Selects the quiet function.
	⑥		Demand button	Selects the demand function.
	⑦		Snow prevention button	Selects the snow prevention function.
	⑧		Water law button	Selects the water law function.

Classification		Indication		Function
Option change function	⑨		Group/ Module button	Selects a group or module control.
	⑩		Monitor button	Shows the result of monitoring water outlet, water inlet, outdoor air, high and low pressure of refrigerant, and water flow rate.
	⑪		Pattern button	Sets the operation pattern when controlling the DVM CHILLER by groups or modules.
	⑫		M/S button	Sets Master or Slave units.
	⑬		Water outlet button	When pressing the water outlet button while the display shows the pressure of refrigerant or the water inlet temperature, the water outlet temperature will be displayed.
Timer function	⑭		Timer button	- Sets the weekly On/Off timer. NOTE - The timer can be set up to maximum 40 timers.
	⑮		Timer display button	- Checks the timer already set. NOTE - You can check the timer by numbers or days of the week.
Common function	⑯		Up, down, left, right button	Moves from stage to stage or changes the set value.
	⑰		OK button	Selects the stage or saves the setting.
	⑱		ESC button	Exits to normal mode without saving your changes while setting the timer or the additional function.
	⑲		Delete button	- Deletes the timer. NOTE - Press button for 3 seconds to delete all the timers while the display shows the timers.
	⑳		Settings button	Enters the additional function setting screen.
LED	㉑		LAMP	- Displays the on/off status of the module or the group on the display. - On : green LED is turned on - Off : green LED is turned off - Error : red LED is blinking NOTE - When one of the modules or groups are operating, the green LED is turned on. - When a certain module or group needs to be inspected, the led LED is blinked.

Note

◆ Mode, temperature, or etc. can be set when only the module control is turned on.

◆           +   +  buttons can be used when the module control is turned off.

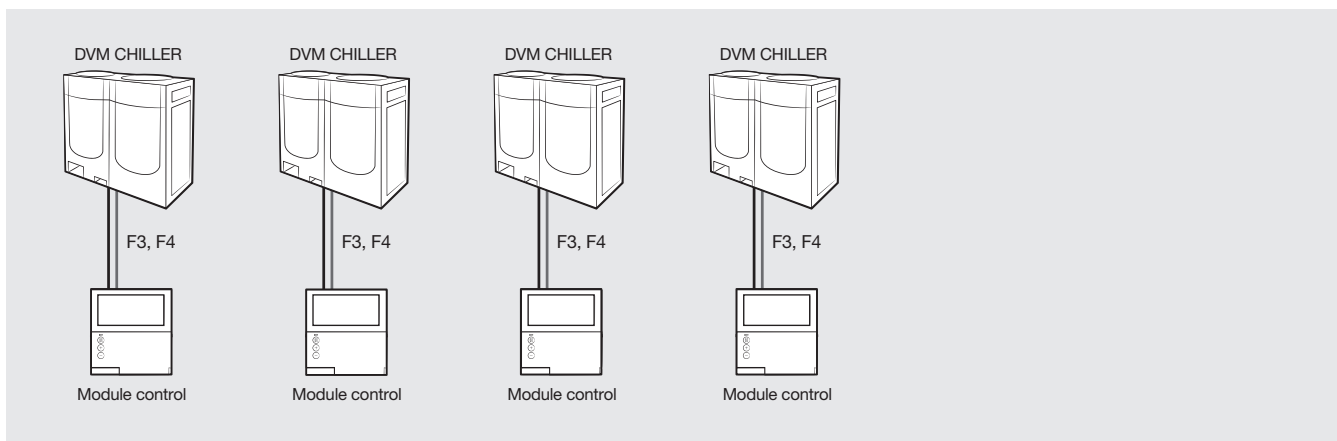
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1. Module control

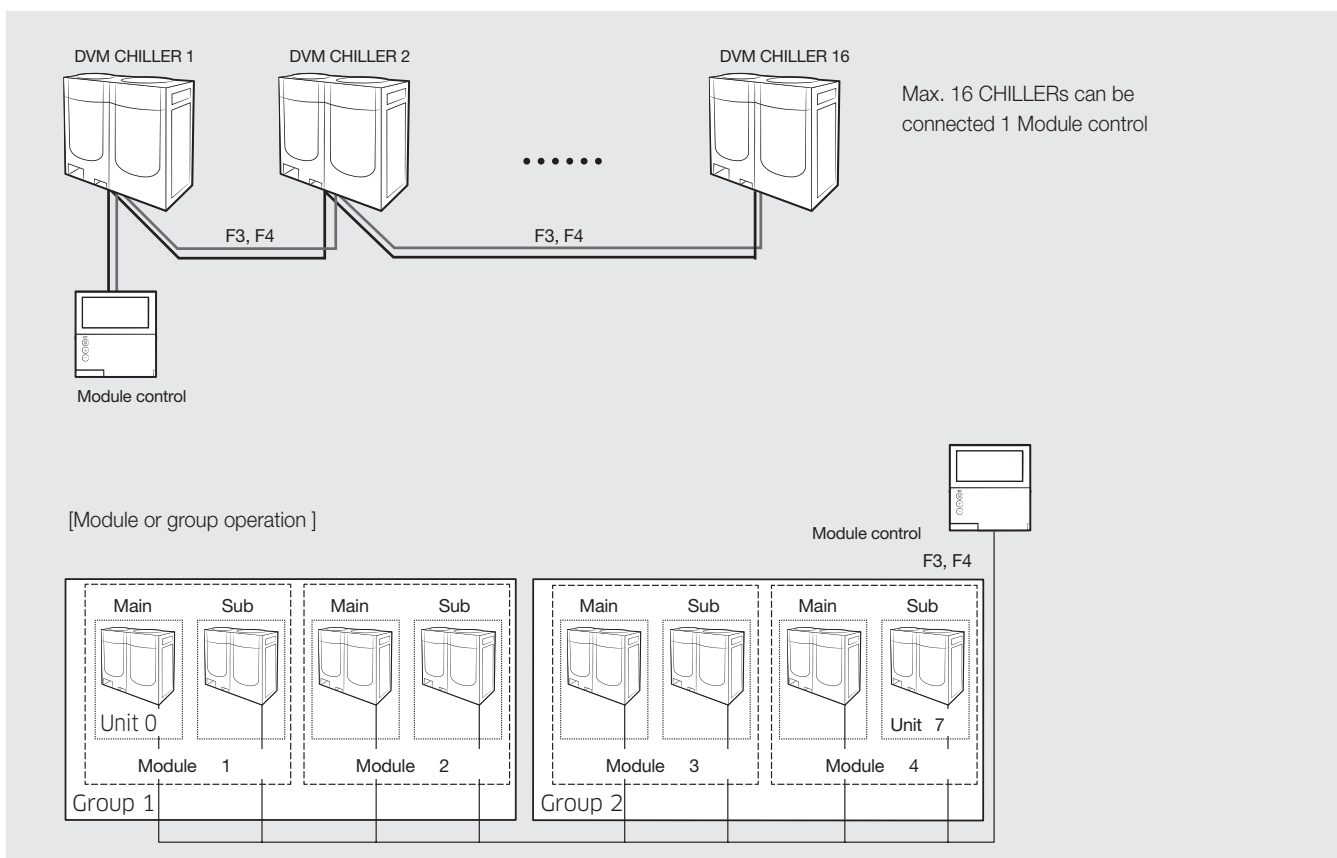
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4) Connection diagram

1 : 1 connection



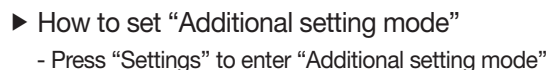
1 : N connection



- Module/group operation is to combine multiple CHILLERs in modules or groups of a single water pipe system and to operate them depending on the working condition.
- A single module control can control a maximum of 16 DVM CHILLERs (0 ~ 15). DVM CHILLER can have a maximum of 8 modules (1 ~ 8) and 4 groups (1 ~4).
A maximum of 8 units can be connected to a module, and a maximum of 8 modules can be connected to a group.

DVM CHILLER
control system

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Main menu	Sub menu	Function		Initial value	Page	Range	Save
1	1	Off timer		0	1	00 ~ 12 hour(s) (by an hour)	Save
3	1	Lock all		0	1	0 - Unlock, 1 - Lock	Save
	2	Lock timer		0	1	0 - Unlock, 1 - Lock	Save
4	1	Set today's date	(yy) year	-	1	00 ~ 99	Save
			(mm) month	-	2	01 ~ 12	Save
			(dd) day	-	3	01 ~ 31	Save
			week) day of week	-	4	Sun. ~ Sat. (0 ~ 6)	Save
	2	Set the current time	Hour : Minute	-	-	Setting range of hour 12-hours : (AM/PM) 01 ~ 12 24-hours : (AM+PM) 00 ~ 23 - Setting range of minute : 0 ~ 59	Save

I DVM CHILLER control system

1. Module control

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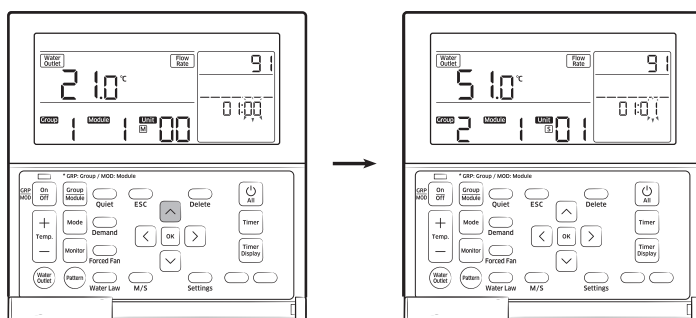
5) Optional function

Additional setting mode

Main menu	Sub menu	Function		Initial value	Page	Range	Save
5	1	Use and set the summer time function	Use the summer time function or not	0	1	0 - No use, 1 - Use	Save
			Set the summer time type	0	2	0 - by a week, 1 - by a day	Save
	2	Start the summer time function (by a week)	Month	3	1	01 ~ 12 (Jan. ~ Dec.)	Save
			Sunday on the selected week	F	2	1 ~ 4 (week) or F - the last week	Save
	3	End the summer time function (by a week)	Month	10	1	01 ~ 12 (Jan. ~ Dec.)	Save
			Sunday on the selected week	F	2	1 ~ 4 (week) or F - the last week	Save
	4	Start the summer time function (by a day)	(mm) month	3	1	01 ~ 12 (Jan. ~ Dec.)	Save
			(dd) day	22	2	01 ~ 31 (day)	Save
	5	End the summer time function (by a day)	(mm) month	9	1	01 ~ 12 (Jan. ~ Dec.)	Save
			(dd) day	22	2	01 ~ 31 (day)	Save
6	1	Set/check the time for backlight		5	1	00 ~ 30 (second) (Disuse when it is 00)	Save
	2	Use LED (green) or not		1	1	0 - No use, 1 - Use	Save
	3	Use LED (red) or not		1	1	0 - No use, 1 - Use	Save
9	1	User setting functions	Display the operating status by units 1)*	The smallest unit number	1	00 ~ 15	-
	2	User setting functions	Display the number of temperature control devices/thermostats	The number of the temperature control devices/thermostats	1	00 ~ 16	-
0	1	Reset to the default value of user mode (except the current time)		0	1	0 - No use, 1 - Reset	-

1)* You can check the status of units connected to the module control.

- When pressing ☐ button after selecting the unit number, you can change the status of the selected unit. (Water Outlet → Water Inlet → Outdoor Air → High Pressure → Low Pressure → Flow Rate →).
- Press ☒, ☐ button to change the unit number



☒ Note

- ♦ The summer time is to put the clock ahead an hour earlier than standard time in summer.

Service mode

► How to set the service mode

(1) Start the service mode.

 +  Press for over 3 seconds

► Caution

- To make it work correctly, you have to press the center of the buttons at the same time.

(2) Select a main menu number.

 /  ► Select a main menu number

(3) Select a sub menu number.

 ►  /  ► Select a sub menu number

(4) Select a Page number.

- When changing a Page number, the display will show the set data value of the Page.

 ►  /  ► Select a Page number

(5) Set Data value.

- Refer to the table in “Service setting mode” for setting each data.

 ►  /  ► Adjust the data value

(6) Save the data setting value.

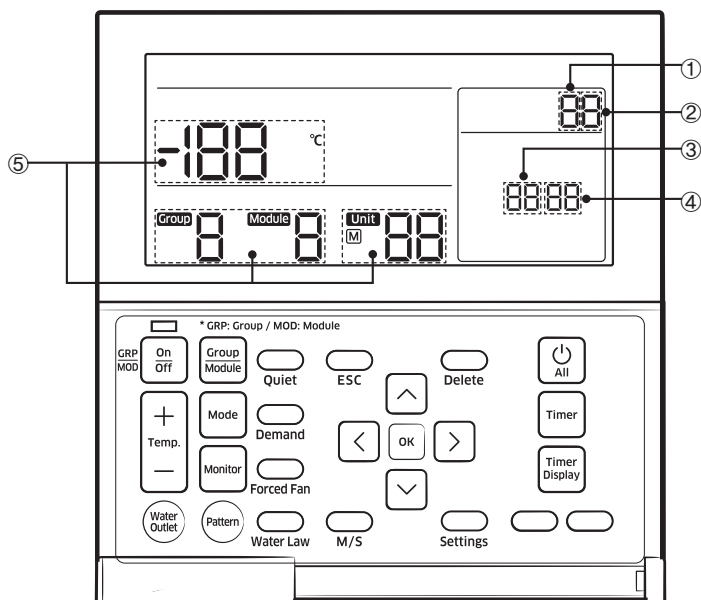


(7) Complete the service mode.



✓ Note

- ♦ If the current setting stage is in the main menu when pressing button, the service mode will be completed. If not, the stage will move to the main menu.



No	Name	Description
①	Main menu	Displays main menu value of the service mode table.
②	Sub menu	Displays sub menu value of the service mode table.
③	Page	Displays Page value of the service mode table.
④	Data Segment	Displays Data value of the service mode table.
⑤	Synchronized segment for setting the current time	Displays the data value of the Page on the left side of the LCD at the same time.

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1. Module control

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5) Optional function

Service setting mode

- After saving the setting, the DVM CHILLERS and the module control may be initialized if it is necessary.
- When entering the service mode during the tracking, you can enter the Data stage on the Main menu 4,5,6,9 (Save at DVM CHILLER) but you cannot change the setting.
 - The display will show Restricted if you press  button.
 - The display shows only the collected data during the tracking.

Main menu	Sub menu	Function		Default value	Page	Data Segment	Save
1	1	Option setting/ checking	DVM CHILLER cooling and heating/ only cooling	0	1	0 - Cooling and heating, 1 - Only cooling	Save at Module control
			Temperature unit display (°C)/(°F)	0	2	0 - Celsius (°C), 1 - Fahrenheit (°F)	Save at Module control
	2	Option setting/ checking 2	Temperature display set temperature/ water temperature (Setting the module control's temperature display value)	1	1	0 - Set temperature 1 - current water outlet temperature (Default value)	Save at Module control
	6	Number of connected units	Number of DVM CHILLERS	0	1	00 ~ 16	-
	7	Setting the unit of the desired temperature (Available only when the temperature display is °C.)		0	1	0 - 1 1 - 0.5 2 - 0.1	Save at Module control
	8	Setting type of time		0	1	0 - 12-hours, 1 - 24-hours	Save at Module control
	9	Check for timer IC error		0	1	0 - Normal, 1 - Error	-
	0	Initializing service mode setting value		0	1	0 - Disuse, 1 - Reset	-
2	1	Checking micom codes of the module control		-	1 ~ 3	Micom code	-
	2	Checking the version information of the module control program		-	1 ~ 3	Modified date	-
4	1	Setting DVM CHILLE number/ option 1)*	Setting a targeted DVM CHILLER	View Master	1	A registered unit number	-
	4		Setting/checking basic options	Basic options of the target	1 ~ 20	Option code	Save at DVM CHILLER
	5		Setting/Checking installation options	Installation options of the target	1 ~ 20	Option code	Save at DVM CHILLER
	6		Setting/Checking installation options 2	Installation options 2 of the target	1 ~ 20	Option code	Save at DVM CHILLER

Main menu	Sub menu	Function		Default value	Page	Data Segment	Save
5	1	Setting DVM CHILLER detailed setting	Demand level ^{2)*}	-	Module number	0 - Default value (100 %) 1 - 95 % 2 - 90 % 3 - 85 % 4 - 80 % 5 - 75 % 6 - 70 % 7 - 65 % 8 - 60 % 9 - 55 % 10 - 50 % 11 - Not applied (unrestricted)	Save at DVM CHILLER
	2		Quiet operation level ^{3)*}	-	Module number	0 - Default value (100 %) 1 - Level1 2 - Level2 3 - Level3	Save at DVM CHILLER
	3		Standard for Water law ^{4)*}	-	Main unit number ^{5)*}	Standard for Water Law temperature 0 : Based on outdoor temperature / 1 : Based on room temperature	Save at DVM CHILLER
	4		AirCool1 (for Water law)	-	Main unit number ^{5)*}	Outdoor temperature standard 1 (0 ~ 20 °C) in cooling mode	Save at DVM CHILLER
	5		AirCool2 (for Water law)	-	Main unit number ^{5)*}	Outdoor temperature standard 2 (30 ~ 40 °C) in cooling mode	Save at DVM CHILLER
	6		RoomCool1 (for Water law)	-	Main unit number ^{5)*}	Room temperature standard 1 (15 ~ 24 °C) in cooling mode	Save at DVM CHILLER
	7		RoomCool2 (for Water law)	-	Main unit number ^{5)*}	Room temperature standard 2 (25 ~ 35 °C) in cooling mode	Save at DVM CHILLER
	8		Tcool1 (for Water law)	-	Main unit number ^{5)*}	Cooling set temperature standard 1 (-10 ~ 25 °C) in cooling mode	Save at DVM CHILLER
	9		Tcool2 (for Water law)	-	Main unit number ^{5)*}	Cooling set temperature standard 2 (-10 ~ 25 °C) in cooling mode	Save at DVM CHILLER

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5) Optional function

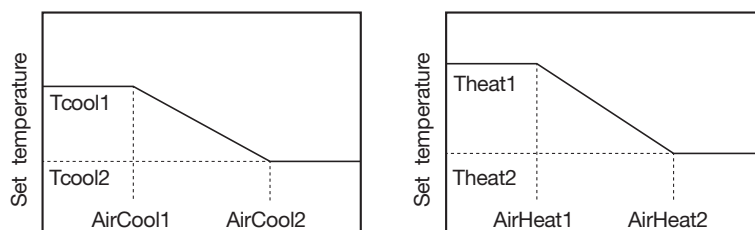
☐ Service setting mode

Main menu	Sub menu	Function		Default value	Page	Data Segment	Save
6	1	DVM CHILLER detailed setting 2	AirHeat1 (for Water law)	-	Main unit number ⁵⁾ *	Outdoor temperature standard 1 (-20 ~ 5 °C) in heating mode	Save at DVM CHILLER
	2		AirHeat2 (for Water law)	-	Main unit number ⁵⁾ *	Outdoor temperature standard 2 (10 ~ 20 °C) in heating mode	Save at DVM CHILLER
	3		RoomHeat1 (for Water law)	-	Main unit number ⁵⁾ *	Room temperature standard 1 (15 ~ 24 °C) in heating mode	Save at DVM CHILLER
	4		RoomHeat2 (for Water law)	-	Main unit number ⁵⁾ *	Room temperature standard 2 (25 ~ 35 °C) in heating mode	Save at DVM CHILLER
	5		Theat1 (for Water law)	-	Main unit number ⁵⁾ *	Heating set temperature standard 1 (35 ~ 55 °C) in heating mode	Save at DVM CHILLER
	6		Theat2 (for Water law)	-	Main unit number ⁵⁾ *	Heating set temperature standard 2 (35 ~ 55 °C) in heating mode	Save at DVM CHILLER
	9		Operation pattern for modules (When operating standard pattern by a group) ⁶⁾ *	-	Module number	0 - Standard 1 - Rotation 2 - Efficiency	Save at DVM CHILLER
9	1	Set groups/ modules ⁷⁾ *	Assign modules/ groups to units	-	Unit number	Group(1 ~ 4) / module (1 ~ 8) / not set '-'	Save at DVM CHILLER
	2	Set a main unit ⁷⁾ *	Set a main unit for modules	- / - / unit	Module number	Unit number of the selected module	Save at DVM CHILLER
	3		Set a main unit for groups	-	Group number	Unit number of the selected group	Save at DVM CHILLER
	4	Device option	Use Cool storage mode	-	1	0 - Disable, 1 - Enable	Save at DVM CHILLER
	5		Use Hot water mode	-	1	0 - Disable, 1 - Enable	Save at DVM CHILLER
	6	Set a backup module ⁸⁾ *	Set a backup module	-	Group number	0 - Disable, 1 ~ 8 - The unit number of the selected module	Save at DVM CHILLER

Main menu	Sub menu	Function		Default value	Page	Data Segment	Save
0	1	Reset	Initialize factory setting of the module control (Initialize user/ service mode setting value)	0	1	0 - No use, 1 - Reset	-
	2		Initialize power master 9)*	0	1	0 - No use, 1 - Reset	-
	3		Initialize DVM CHILLER and module control's addressing	0	1	0 - No use, 1 - Reset	-

- 1)* • In 4-1 menu, the units connected to the module control will be displayed. Select the unit that you want to set and then move to 4-4, 5, 6 menu.
- 2)* • Set a current limit rate. If you set the value less than 100 %, performance may decrease.
- 3)* • Set a level of the Quiet mode. Level3 is the lowest, performance and efficiency may decrease if the Quiet mode operates.
- 4)* • Select a standard for Water law when operating cooling or heating. Water law is to change the water outlet temperature, considering demand load changes according to outdoor or indoor temperature.

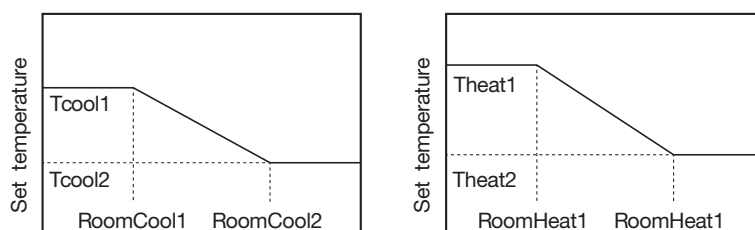
- According to outdoor temperature



☒ **Note**

- ♦ If the unit is not a low temperature water model, the set temperature decided by the Water law control will not decrease below 5 °C.

- According to indoor temperature (when using an external temperature sensor)



☒ **Note**

- ♦ If the unit is not a low temperature water model, the set temperature decided by the Water law control will not decrease below 5 °C.

- 5)* • A main unit of a group or a module will be displayed.
- When setting a group, the value for a main unit of the group must be set.
- 6)* • When setting "Standard pattern" for a group, you must set an operation pattern for each module in the group.
- 7)* • Only when completing setting a group or a module and their main units, the module control will operate properly.
- When completing the a group or a module setting and then exiting from service mode, the module control will be initialized and the tracking will be performed again.
- 8)* • If a backup unit is selected, the unit will operate depending on the standards for DVM CHILLER.
- A backup module does not operate in the normal operation condition. If performance by operating the normal modules is not enough, the backup module will operate.
- 9)* • Power Master Reset is a setting needed to supply optimized power to the module control when multiple DVM CHILLERs are connected to the module control.

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Ver.1.0

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B2B PM / SE

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