

Application Note: 3003

Central Controller BACnet points

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Overview

The purpose of this Application Note is to provide a basic understanding of the BACnet points available through Mitsubishi Electric controllers.

Notes

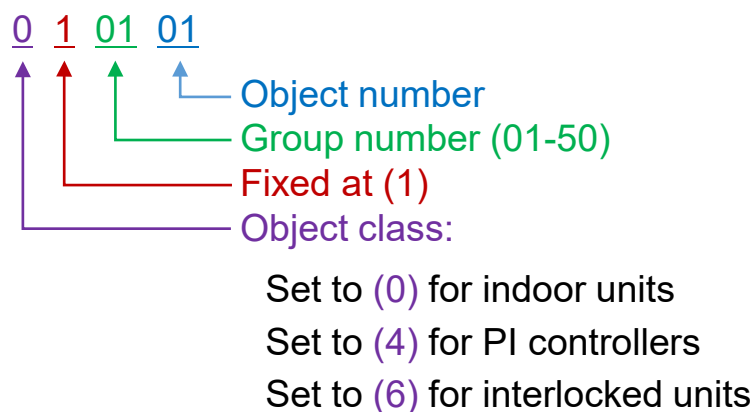
1. The availability of various BACnet points is dependent upon the compatibility of the connected equipment.
2. Central Controllers capable of utilizing BACnet points are listed as follows:
 1. AE-200A
 2. AE-50A
 3. EW-50A

Quick References

Object Types:

AI	Analog Input
AV	Analog Value
BI	Binary Input
BO	Binary Output
BV	Binary Value
MI	Multi-state Input
MO	Multi-state Output

Instance Numbers



List of points by connected equipment type

Object	Object type	Instance number	Unit type			Remarks
			Indoor unit and OA Processing Unit that is not interlocked with indoor units	LOSSNAY unit that is not interlocked with indoor units	Air To Water	
On Off Setup	BO	01xx01	V	V	V	*5
On Off State	BI	01xx02	V	V	V	
Alarm Signal	BI	01xx03	V	V	V	
Error Code	MI	01xx04	V	V	V	
Operational Mode Setup	MO	01xx05	V	—	—	
Operational Mode State	MI	01xx06	V	—	—	
Fan Speed Setup	MO	01xx07	V	V	—	
Fan Speed State	MI	01xx08	V	V	—	
Room Temp [Water Temp]	AI	01xx09	V	—	V	*8
Set Temp [Set Water Temp]	AV	01xx10	V	—	V	*2
Filter Sign [Circulating Water Exchange Sign]	BI	01xx11	V	V	V	
Filter Sign Reset [Circulating Water Exchange Sign Reset]	BV	01xx12	V	V	V	
Prohibition On Off	BV	01xx13	V	V	V	*5
Prohibition Mode	BV	01xx14	V	—	V	
Prohibition Filter Sign Reset [Prohibition Circulating Water Exchange Sign Reset]	BV	01xx15	V	V	V	
Prohibition Set Temperature	BV	01xx16	V	—	V	
Prohibition Fan Speed	BV	01xx17	V	—	—	*1 *6
M-NET Communication State	BI	01xx20	V	V	V	
System Forced Off	individual	BV	01xx21	V	V	
	collective	019921	V			
Air Direction Setup	MO	01xx22	V	—	—	*1
Air Direction State	MI	01xx23	V	—	—	*1
Set Temp Cool	AV	01xx24	V	—	—	*2
Set Temp Heat	AV	01xx25	V	—	—	*2
Set Temp Auto	AV	01xx26	V	—	—	*2
Set High Limit Setback Temp	AV	01xx27	V	—	—	
Set Low Limit Setback Temp	AV	01xx28	V	—	—	
Ventilation Mode Setup	MO	01xx35	V	V	—	*3
Ventilation Mode State	MI	01xx36	V	V	—	*3
Air To Water Mode Setup	MO	01xx37	—	—	V	
Air To Water Mode State	MI	01xx38	—	—	V	
Group Apportioned Electric Energy	AC	01xx39	V	V	V	
Interlocked Units Apportioned Electric Energy	AC	61aa39	—	—	—	*4

List of points by connected equipment type

Object	Object type	Instance number	Unit type			Remarks
			Indoor unit and OA Processing Unit that is not interlocked with indoor units	LOSSNAY unit that is not interlocked with indoor units	Air To Water	
Plcontroller Electric Energy 1-4	AC	41mm40-43	—	—	—	
Pulse Input Electric Energy 1-4	AC	410040-43	—	—	—	
Group Apportionment Parameter	AC	01xx44	V	—	V	
Interlocked Units Apportionment Parameter	AC	61aa44	—	—	—	*4
Night Purge State	BI	01xx46	V	V	—	*3
Thermo On Off State	BI	01xx47	V	—	V	
Error Code Detail	AI	01xx49	V	V	V	
External Heat Source State	BI	01xx50	V	—	—	*7
Plcontroller Alarm Signal	BI	41mm03	—	—	—	
Trend Log Room Temp	LOG	01xx80	V	—	V	
Trend Log Group Apportioned Electric Energy	LOG	01xx83	V	V	V	
Trend Log Interlocked Units Apportioned Electric Energy	LOG	61aa83	—	—	—	*4
Trend Log Plcontroller Electric Energy 1-4	LOG	41mm84-87	—	—	—	
Trend Log Pulse Input Electric Energy 1-4	LOG	410084-87	—	—	—	
Trend Log Group Apportionment Parameter	LOG	01xx88	V	—	V	
Trend Log Interlocked Units Apportionment Parameter	LOG	61aa88	—	—	—	*4

*1 An OA Processing Unit which is not interlocked with an indoor unit is not supported.

*2 An example of the temperature setting range for the indoor unit/Air To Water is shown in the following table. (Indicates the setting temperature range of a typical model. May differ depending on the model).

Indoor unit

Operational mode		Cool	Heat	Auto	Dry
Standard model	Auto (Single-set-point) mode	19-30°C	17-28°C	19-28°C	19-30°C
	Auto (Dual-set-points) mode	19-35°C	4.5-28°C	Cool: 19-35°C Heat: 4.5-28°C	19-35°C
E-OA model		10-24.5°C	17-35°C	17-24.5°C	10-24.5°C

Air To Water

Operational mode	Heating	Heating ECO	Hot Water	Anti-freeze	Cooling
Booster unit (BU)	30-50°C	30-45°C	30-70°C	10-45°C	Invalid
HEX unit (AU)	30-45°C	30-45°C	Invalid	10-45°C	10-30°C

(Conversion for communication of the air conditioning equipment and BACnet® is carried out within a range of 0 to 99°C.)

*3 Supported only by LOSSNAY and OA Processing Unit that are not interlocked with indoor units.

*4 Supported by OA Processing Unit that is interlocked with indoor units.

*5 Do not use this when "External Input Setting" for AE-200/AE-50/EW-50 is set to "ON/OFF (Level signal)". "External Input Setting" can be configured on the Initial Setting Tool or AE-200/AE-50's LCD. (Refer to the AE-200/AE-50/EW-50 Instruction Book (Initial Settings) for settings methods.)

*6 Can be used when the indoor unit supports "Prohibition Fan Speed".

*7 Can be used on the unit models produced in April 2012 or later.

*8 When E-OA model unit is connected, outlet air measurement temperature is used.

Details on Object Types and Instance Numbers

Object	Object type	Instance number	Units					Remarks
			Inactive(0)*23	Active(1)				
			Text-1(1)*23	Text-2(2)	Text-3(3)	Text-4(4)	Text-5(5)	
On Off Setup	BO	01xx01	Stop	Run				*20
On Off State	BI	01xx02	Stop	Run				*20
Alarm Signal	BI	01xx03	Normal	Error				
Error Code	MI	01xx04	01: Normal 02: Other errors 03: Refrigeration system fault 04: Water system error 05: Air system error		06: Electronic system error 07: Sensor fault 08: Communication error 09: System error			
Operational Mode Setup	MO	01xx05	01: Cool 02: Heat 03: Fan		04: Auto 05: Dry 06: Setback			*1 *16 *18 *22
Operational Mode State	MI	01xx06	01: Cool 02: Heat 03: Fan		04: Auto 05: Dry 06: Setback			*1 *3 *16 *18 *22
Fan Speed Setup	MO	01xx07	01: Low 02: High 03: Mid 2		04: Mid 1 05: Auto			*4 *5 *18
Fan Speed State	MI	01xx08	01: Low 02: High 03: Mid 2		04: Mid 1 05 Auto			*4 *5 *18 *21
Room Temp [Water Temp]	AI	01xx09	°F/°C					*16 *25
Set Temp [Set Water Temp]	AV	01xx10	°F/°C					*16 *25
Filter Sign [Circulating Water Exchange Sign]	BI	01xx11	OFF	ON				
Filter Sign Reset [Circulating Water Exchange Sign Reset]	BV	01xx12	Reset	Void				
Prohibition On Off	BV	01xx13	Permit	Prohibit				*20
Prohibition Mode	BV	01xx14	Permit	Prohibit				*16
Prohibition Filter Sign Reset [Prohibition Circulating Water Exchange Sign Reset]	BV	01xx15	Permit	Prohibit				

Details on Object Types and Instance Numbers

Object		Object type	Instance number	Units					Remarks
				Inactive(0)*23	Active(1)				
				Text-1(1)*23	Text-2(2)	Text-3(3)	Text-4(4)	Text-5(5)	
Prohibition Set Temperature		BV	01xx16	Permit	Prohibit				*16
Prohibition Fan Speed		BV	01xx17	Permit	Prohibit				
M-NET Communication State		BI	01xx20	Normal	Error				
System Forced Off	individual	BV	01xx21	Reset	Execute				*10 *11
	collective		019921						
Air Direction Setup		MO	01xx22	Horizontal	Downblow 60%	Downblow 80%	Downblow 100%	Swing	*14 *16 *18
Air Direction State		MI	01xx23	Horizontal	Downblow 60%	Downblow 80%	Downblow 100%	Swing	*8 *14 *16 *18
Set Temp Cool		AV	01xx24	°F/°C					*16 *18
Set Temp Heat		AV	01xx25	°F/°C					*16 *18
Set Temp Auto		AV	01xx26	°F/°C					*16 *18
Set High Limit Setback Temp		AV	01xx27	°F/°C					*16 *18 *19
Set Low Limit Setback Temp		AV	01xx28	°F/°C					*16 *18 *19
Ventilation Mode Setup		MO	01xx35	Heat Recovery	Bypass	Auto			*15 *18
Ventilation Mode State		MI	01xx36	Heat Recovery	Bypass	Auto			*15 *18 *21
Air To Water Mode Setup		MO	01xx37	Heating	Heating ECO	Hot Water	Anti-freeze	Cooling	*15 *16 *17
Air To Water Mode State		MI	01xx38	Heating	Heating ECO	Hot Water	Anti-freeze	Cooling	*15 *16 *17
Group Apportioned Electric Energy		AC	01xx39	0.1 [kWh]					*2
Interlocked Units Apportioned Electric Energy		AC	61aa39	0.1 [kWh]					*2 *7
Plcontroller Electric Energy 1—4		AC	41mm40—43	0.1 [kWh]					*2 *6 *13 *15 *16 *17 *18
Pulse Input Electric Energy 1—4		AC	410040—43	0.1 [kWh]					*2 *12 *13 *15 *16 *17 *18
Group Apportionment Parameter		AC	01xx44	No Units					*2
Interlocked Units Apportionment Parameter		AC	61aa44	No Units					*2 *7
Night Purge State		BI	01xx46	OFF	ON				*15 *18
Thermo On Off State		BI	01xx47	OFF	ON				*16
System Alarm Signal		BI	010048	Normal	Error				
Error Code Detail		AI	01xx49	No Units					
External Heat Source State		BI	01xx50	OFF	ON				
Plcontroller Alarm Signal		BI	41mm03	Normal	Error				*6
Trend Log Room Temp		LOG	01xx80						*9 *16 *24 *25

Details on Object Types and Instance Numbers

Object	Object type	Instance number	Units					Remarks
			Inactive(0)*23	Active(1)				
			Text-1(1)*23	Text-2(2)	Text-3(3)	Text-4(4)	Text-5(5)	
Trend Log Group Apportioned Electric Energy	LOG	01xx83						*2 *24
Trend Log Interlocked Units Apportioned Electric Energy	LOG	61aa83						*2 *7 *24
Trend Log PIcontroller Electric Energy 1–4	LOG	41mm84–87						*2 *6 *13 *15 *16 *17 *18 *24
Trend Log Pulse Input Electric Energy 1–4	LOG	410084–87						*2 *13 *15 *16 *17 *18 *24
Trend Log Group Apportionment Parameter	LOG	01xx88						*2 *24
Trend Log Interlocked Units Apportionment Parameter	LOG	61aa88						*2 *7 *24

*1 "Dry" can be used only when the "Use Dry Mode" setting is enabled (checked) on the BACnet® Setting Tool. (The default setting is disabled (unchecked).)

*2 "Charge" license is required for AE-200/AE-50/EW-50.

*3 When the "Operational Mode State" received from the indoor unit is "Auto Cool", "Cool" can be selected; when it is "Auto Heat", "Heat" can be selected, or "Auto" can be selected for both.

*4 "Use Fan Speed Mid1/Mid2" setting of the BACnet® Setting Tool, and effective fan speeds from indoor unit, LOSSNAY, and OA Processing Unit fan speed switching steps are shown in the table below. (The default setting of "Use Fan Speed Mid1/Mid2" of the BACnet® Setting Tool is disabled (unchecked).)
(In the automatic wind velocity compatible model, "Auto" is valid in addition to the fan speed in this table.)

V: Available

Unit type	"Use Fan Speed Mid1/Mid2" setting	Number of available fan speeds	Available fan speed			
			Low	Mid 2	Mid 1	High
Indoor unit	Enabled	2		V		V
		3		V	V	V
		4	V	V	V	V
	Disabled	2-4	V			V
LOSSNAY and OA Processing Unit	Enabled	1				V
		2	V			V
		3	V	V		V
		4	V	V	V	V
	Disabled	1				V
		2-4	V			V

*5 Low < Mid 2 < Mid 1 < High

*6 mm: PI controller address (01-50)

*7 Can be used only for the interlocked units.

aa: Interlocked unit address (01-50)

*8 When the air direction received from the indoor unit is "Downblow 20%" or "Auto", "Horizontal" will be output to BACnet®.

*9 The value of the "Present_Value" in the "Room Temp" (AI_01xx09) object is logged in as the log record.

*10 Batch commands are made for the "System Forced Off" instance number (019921) for all groups.

*11 When the "System Forced Off" (individual/collective) from BACnet® communication is used, do not set the "External Input Setting" for AE-200/AE-50/EW-50 to "ON/OFF (Level signal)". "External Input Setting" can be configured on the Initial Setting Tool, Web Browser for Initial Settings, or AE-200/AE-50's LCD. (Refer to the AE-200/AE-50/EW-50 Instruction Book (Initial Settings) for settings methods.)

*12 Electric energy for the electricity meter connected to the Pulse Input (PI) of AE-50/EW-50

*13 Electric energy 1 to 4 correspond to signal lines Ch1 to 4 on the PI controller or metering devices 1 to 4 connected to Pulse Input (PI) of AE-50/EW-50.

Details on Object Types and Instance Numbers

- *14 It may differ from the actual air direction depending on the type of indoor unit (Ceiling-concealed Ducted, Wall-mounted, Floor-standing). An example of a Floor standing PFFY-P VKM-E is as follows.

	Setting/Status				
Air direction on the BACnet®	Horizontal	Downblow 60%	Downblow 80%	Downblow 100%	Swing
Actual air direction	Upblow 100%	Upblow 80%	Upblow 60%	Horizontal	Swing

- *15 Cannot be used with an indoor unit model.
Differences in supported/not supported objects depending on whether it is an indoor unit, LOSSNAY or the Air To Water model are indicated on the following page.
- *16 Cannot be used with a LOSSNAY which is not interlocked with an indoor unit.
Differences in supported/not supported objects depending on whether it is an indoor unit, LOSSNAY or the Air To Water model are indicated on the following page.
- *17 Cannot be used with an OA Processing Unit which is not interlocked with an indoor unit.
Differences in supported/not supported objects depending on whether it is an indoor unit, LOSSNAY or the Air To Water model are indicated on the following page.
- *18 Cannot be used with an Air To Water model.
Differences in supported/not supported objects depending on whether it is an indoor unit, LOSSNAY or the Air To Water model are indicated on the following page.
- *19 It can only be used if the system controller is AE-200/AE-50A/EW-50A and the indoor unit is a Setback mode supported model.
- *20 Do not use this when "External Input Setting" for AE-200/AE-50/EW-50 is set to "ON/OFF (Level signal)". "External Input Setting" can be configured on the Initial Setting Tool or AE-200/AE-50's LCD. (Refer to the AE-200/AE-50/EW-50 Instruction Book (Initial Settings) for settings methods.)
- *21 During Night Purge state, this operates using a specific fan speed and ventilation mode, but these are not reflected in the status display. As a result, the read status from BACnet® communications may differ from actual fan speeds and ventilation modes. Additionally, carrying out fan speed and ventilation mode settings during Night Purge state will not change actual operation, and these will only be reflected in the status display.
- *22 "Setback" is available only when the "Old model compatibility mode" is set to "OFF" on the Initial Setting Tool or AE-200/AE-50's LCD.
- *23 "Inactive(0),Active(1)" is applied when the object type is BO/BI/BV, and "Text-1(1),Text-2(2),..." is applied when the object type is MO/MI.
- *24 Use the BACnet® Trial Run Tool to check or set the "Log_Interval" property. (Refer to the AE-200/AE-50/EW-50 Instruction Book (BACnet® Trial Run Tool) for settings methods.)
- *25 When E-OA model unit is connected, outlet air measurement temperature is used for "Room Temp/Trend Log Room Temp," and outlet air preset temperature is used for "Set Temp."

List of points for Auto Mode

5-3. Set temperature objects

Select the set temperature objects below according to the indoor unit group configuration in a given air conditioning system.

V: Selectable
—: Not selectable

Object	Object type	Instance number	Models that support the Auto (Dual-set-points) mode *3			Models that do not support the Auto (Dual-set-points) mode *3
			Auto (Single-set-point) mode *1	Auto (Dual-set-points) mode *1	Old model compatibility mode *2	
Set Temp	AV	01xx10	—	—	V	V
Set Temp Cool	AV	01xx24	V	V	—	—
Set Temp Heat	AV	01xx25	V	V	—	—
Set Temp Auto	AV	01xx26	V	—	—	—
Set High Limit Setback Temp	AV	01xx27	V*4	V*4	—	—
Set Low Limit Setback Temp	AV	01xx28	V*4	V*4	—	—

*1 Auto (Single-set-point) mode or Auto (Dual-set-points) mode can be set on the local remote controller for each indoor unit. Refer to the indoor unit Instruction Book for details about these modes.

*2 Old model compatibility mode can be collectively set for the M-NET system on the Initial Setting Tool or AE-200/AE-50's LCD. (Refer to the AE-200/AE-50/EW-50 Instruction Book (Initial Settings) for settings methods.)

*3 Selectable/Not selectable of Auto (Dual-set-points) mode is determined automatically for each group. (Group is treated as Auto (Dual-set-points) mode selectable only if all indoor units, all remote controllers, and all system controllers are Auto (Dual-set-points) mode selectable.)

*4 It can only be used if the system controller is AE-200A/AE-50A/EW-50A and the indoor unit is a Setback mode supported model.

*5 When E-OA model unit is connected, outlet air preset temperature is used.

(1) When the building management system supports two temperature setting (for cooling and heating individually)

Use temperature setting object for "Set Temp" (AV_01xx10) in a group which includes an Auto (Dual-set-points) mode unsupported model.

When operating an Auto (Single-set-point) mode indoor unit in the operation mode "Auto", use the temperature setting object for "Set Temp Auto" (AV_01xx26).

When operating an Auto (Dual-set-points) mode indoor unit in the operation mode "Auto", use the temperature setting object for "Set Temp Cool" (AV_01xx24) and "Set Temp Heat" (AV_01xx25).

(2) When the building management system supports only one temperature setting (common for cooling and heating)

Set the "Old model compatibility mode" setting to "ON" on the Initial Setting Tool or AE-200/AE-50's LCD.
Use the temperature setting object for "Set Temp" (AV_01xx10).