

IntesisBox[®] **PA-AW-KNX-1**

User's Manual

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Interface for the integration of Panasonic's Air-to-Water units into KNX TP-1 (EIB) control systems.

Compatible with Air-to-Water Aquarea series.

Application's Program Version: 1.0

Reference: **PA-AW-KNX-1**

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1. Presentation



The PA-AW-KNX-1 gateway allows fully bidirectional monitoring and control of the Panasonic Air-to-Water systems from KNX installations.

The interface is compatible with all the models of the Aquarea line commercialized by Panasonic.

General features:

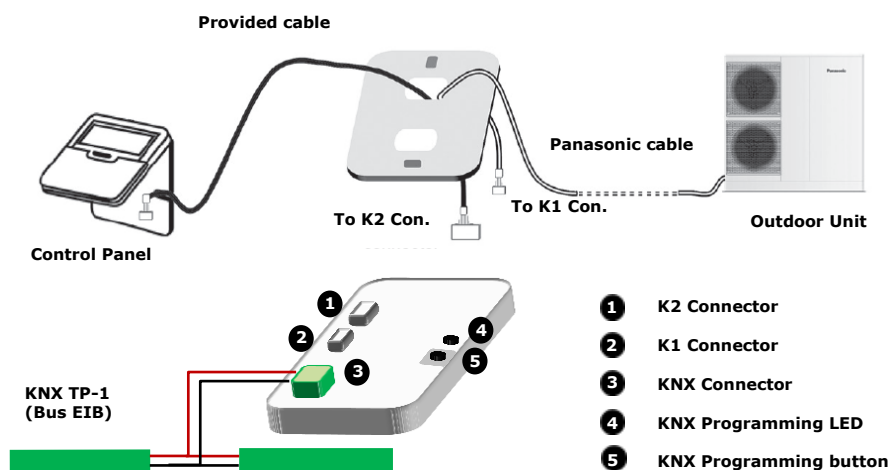
- Reduced dimensions.
- Easy and fast installation.
- External power not required.
- Direct connection to the A.W. system.
- Multiple control and status objects (bit, byte, characters...) with standard KNX datapoints.
- One status object available for each control object.
- Total supervision and control of the Panasonic A.W. unit from KNX, including unit internal variables supervision, special modes control and error alarm and codes too.

2. Connection

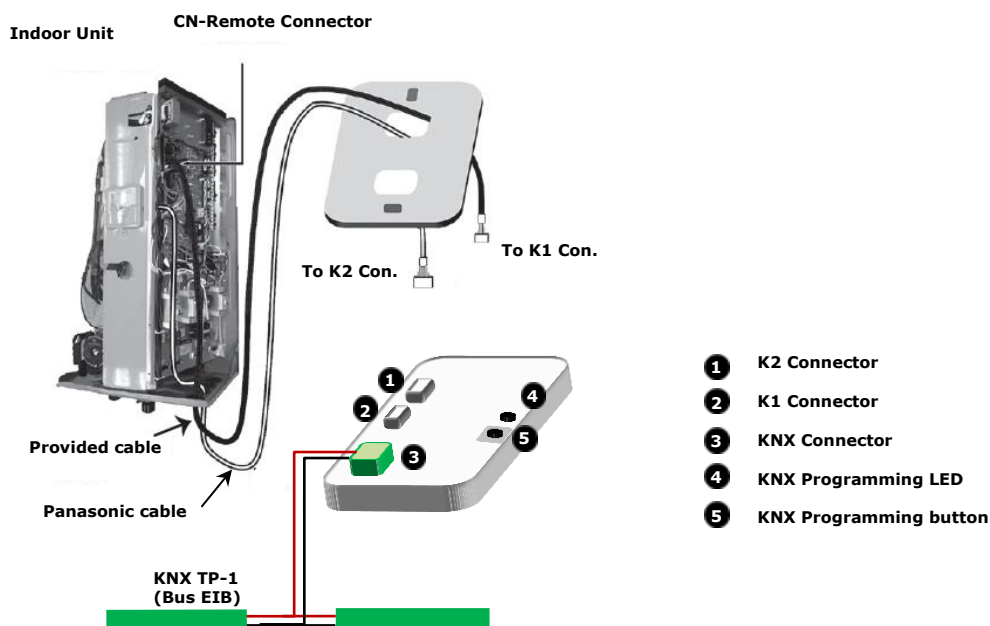
Connection of the interface to the Aquarea system may vary depending on the different available models. Below you will find a sketch for the Monobloc system and after that an example for the Bibloc system. Please, use only the cables supplied by Panasonic and ourselves to carry out the connection process.

Connection of the interface to the KNX bus is by means of the standard KNX bus connector also supplied with the interface.

Connections diagram for Aquarea Monobloc systems:



Connections diagram for Aquarea Bibloc systems:



3. Installation and setup

This is a fully compatible KNX device that must be configured using the ETS software. The ETS database can be downloaded from:

<http://www.intesis.com/download/eib/PA-AW-KNX-1.zip>

Please, check the README.txt file located inside the zip file to find instructions for proper installation of the database.

⚠ IMPORTANT: Do not forget to select the corresponding features of the Air-to-Water system connected to the PA-AW-KNX-1 interface. This should be selected in the "Parameters" section on the ETS software.

4. ETS parameters and communication objects

4.1 Default settings

When importing the ETS database for the first time, the following menu appears, with these parameter values selected as default:

Figure 4.1 Parameter values by default

With this configuration is possible to control the system (Control_ objects) and monitoring it (Status_ objects) through the communication objects listed below.

⚠ IMPORTANT: Values shown in the PA-AW-KNX-1 and in the Panasonic Control Panel may differ due to the non-synchronous behavior of the Panasonic Aquarea system.

This affects the following communication objects:

- Outd. temperature for Low water temperature
- Outd. temperature for High water temperature
- Water temp at Low outd. temp
- Water temp at High outd. temp
- Outlet Water current Thermoshift
- Quiet

4.1.1 Start or Stop the unit

This object allows turning the Aquarea unit on or off. Sending a "0" value will turn it off, while sending a "1" value will turn it on.

```

0  Control_ On/Off [DPT_1.001] - 0-Off;1-On
17 Status_ On/Off [DPT_1.001] - 0-Off;1-On

```

Figure 4.2 Start/Stop communication objects

4.1.2 Quiet mode

This object allows turning on or off the Aquarea quiet mode. Sending a "1" value, the AW unit will turn on the "Quiet" mode. Sending a "0" value, the AW unit will turn off the "Quiet" mode. Please, check your system features in your AW user/installation manual to ensure that your climate system has this feature available and also to find more information for each function.

```

1  Control_ Quiet [DPT_1.001] - 0-Off;1-On
18 Status_ Quiet [DPT_1.001] - 0-Off;1-On

```

Figure 4.3 Quiet mode communication objects

4.1.3 Heat Mode

This object allows turning the "HEAT" mode On or Off. Sending a "0" value will leave the "HEAT" mode off, while sending a "1" value will turn the "HEAT" mode on. Please, check your system features in your AW user/installation manual to ensure that your climate system has this feature available and also to find more information for each function.

- 2 Control_Mode Heat [DPT_1.002] - 1-Set/0-Clear HEAT Mode
- 19 Status_Mode Heat [DPT_1.002] - 1-Mode in HEAT

Figure 4.4 Heat mode communication objects

4.1.4 Temperatures

PA-AW-KNX-1 is capable of controlling several temperature parameters of the Aquarea system. Please, check your system features in your AW user/installation manual to ensure that your climate system has these features available and also to find more information for each function.

Heating Setpoint Temperature

This Status_ communication object is used to indicate the cooling setpoint temperature. Value ranges may vary from 20°C to 70°C.

- 22 Status_ Heating Setpoint Temperature [DPT_9.001] - °C

Figure 4.5 Heating Setpoint Temperature communication object

Outlet Water Temp

This Status_ communication object is used to indicate the outlet water temperature. Value ranges may vary from 0°C to 127°C.

- 30 Status_ Outlet Water Temp [DPT_9.001] - °C

Figure 4.6 Outlet Water Temperature communication object

Inlet Water Temp

This Status_ communication object is used to indicate the inlet water temperature. Value ranges may vary from 0 °C to 127 °C.

- 31 Status_ Inlet Water Temp [DPT_9.001] - °C

Figure 4.7 Inlet Water Temperature communication object

Outdoor Temperature

This Status_ communication object is used to indicate the current outdoor temperature. Value ranges may vary from -127 °C to 127 °C.

- 32 Status_ Outdoor Temperature [DPT_9.001] - °C

Figure 4.8 Outdoor Temperature communication object

Outd. Temperature for Low water temp

These communication objects are used to control and monitor the outdoor (Outd.) temperature for heating mode when water temperature is low. Value ranges may vary from -15 °C to 15 °C. See Figure 4.14 for more information.

- 8 Control_ Outd. temp for Low water temp [DPT_9.001] - °C
- 33 Status_ Outd. temp for Low water temp [DPT_9.001] - °C

Figure 4.9 Outd. Temperature for Low water temp communication objects

Outd. Temperature for High water temp

These communication objects are used to control and monitor the outdoor (Outd.) temperature for heating mode when water temperature is high. Value ranges may vary from -15 °C to 15 °C. See Figure 4.14 for more information.

- 9 Control_ Outd. temp for High water temp [DPT_9.001] - °C
- 34 Status_ Outd. temp for High water temp [DPT_9.001] - °C

Figure 4.10 Outd. Temperature for High water temp communication objects

Water temp at Low outd. temp

These communication objects are used to control and monitor the water temperature setpoint for heating when outdoor (Outd.) temperature is low. Value ranges may vary from -25 °C to 15 °C. See Figure 4.14 for more information.

- 10 Control_ Water temp at Low outd. temp [DPT_9.001] - °C
- 35 Status_ Water temp at Low outd. temp [DPT_9.001] - °C

Figure 4.11 Water temperature setpoint at low outdoor temperature communication objects

Water temp at high outd. temp

These communication objects are used to control and monitor the water setpoint temperature for heating when outdoor (Outd.) temperature is high. Value ranges may vary from -25 °C to 15 °C. See Figure 4.14 for more information.

- 11 Control_ Water temp at High outd. temp [DPT_9.001] - °C
- 36 Status_ Water temp at High outd. temp [DPT_9.001] - °C

Figure 4.12 Water temperature setpoint at high outdoor temperature communication objects

Outlet Water Current Thermoshift

This object allows setting the shift on the setpoint temperature in the outlet water. By applying this shifting user can adjust the temperature to its needs. Value ranges may vary from -5 °C to 5 °C. See Figure 4.14 for more information.

- 12 Control_ Water Current Thermoshift [DPT_9.001] - °C
- 37 Status_ Outlet Water Curr Thermoshift [DPT_9.001] - °C

Figure 4.13 Outlet Water Current Thermoshift communication objects

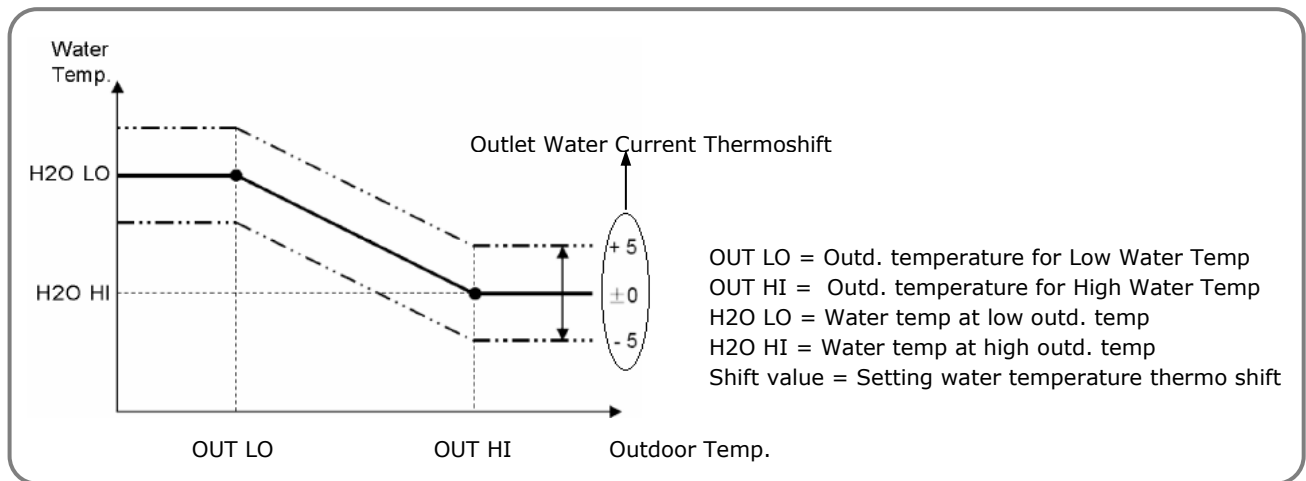


Figure 4.14 Water Outlet Temperature and thermoshift for Heat mode

4.1.5 Compressor

PA-AW-KNX-1 is also capable of monitoring and control some parameters related with the compressor of the AW system. Please, check your system features in your AW user/installation manual to ensure that your climate system has these features available and also to find more information for each function

Compressor Operating Hours

In this case, the Control object and the Status object are used independently.

The Control object is only suitable for resetting the Operating Hours. This means that when a '1' value is sent the counter will be reset.

The Status object is only showing the amount of hours that the unit has been operating since the last reset (in case of any).

- 13 Control_ Reset Comp Operating Hours [DPT_1.015] - 1-Reset
- 39 Status_ Compressor Operating Hours [DPT_7.007] - h

Figure 4.15 Operating hours communication objects

Compressor Frequency

This object allows monitoring the compressor frequency.

- 38 Status_ Compressor Frequency [DPT_14.033] - Hz

Figure 4.16 Outdoor Temperature communication object

4.1.6 Error and Alarm

PA-AW-KNX-1 controls the error and alarm status of the unit in a three level way: Simple error/alarm signal, current error and historic errors. Please, visit section 7 for more information related with error codes and also check your AW user/installer manual for more details.

Error/Alarm

This object indicates if there is any alarm or error active in the system.

■↔ 40 Status_Error/Alarm [DPT_1.005] - 0-No alarm;1-Alarm

Figure 4.17 Error and alarm communication object

Current Error

In case an error is present currently in the system, this status object indicates which error is. See section 7 to get more information about the error codes.

■↔ 41 Status_Current Error Code [2byte] - 0-No error/Any other see man.
■↔ 42 Status_Current Error Code Text [DPT_16.001] - 3-char PA Error;Empty-None

Figure 4.18 Errors and alarms communication objects

- Control_Reset Current Error

This control object is used to reset the current error. If '1' value is sent, the current error will be deleted. If error has been solved, the Status object will stop showing the current error.

■↔ 14 Control_Reset Current Error [DPT_1.015] - 1-Reset

Figure 4.19 Reset Current Error communication object

History Error

In case an error has been present in the system, this status object indicates the last one which had happened. See section 7 to get more information about the error codes.

■↔ 43 Status_Error Code History [2byte] - 0-No error/Any other see man.
■↔ 44 Status_Error Code History Text [DPT_16.001] - 3-char PA Error;Empty-None

Figure 4.20 History Error communication objects

- Control_Reset Error History

This control object is used to reset the history error. If '1' value is sent, the error history will be deleted. If errors have been solved, the Status object will stop showing any error.

■↔ 15 Control_Reset Error History [DPT_1.015] - 1-Reset

Figure 4.21 Reset Error History communication object

4.1.7 Back to factory settings

This control object is used to restore the factory settings of the AW system. If '1' value is sent, the AW system will recover its factory settings. Please, check your AW user/installation manual to find more information.

16 Control_Back to Factory Settings [DPT_1.015] - 1-Reset

Figure 4.22 Reset Error History communication object

4.2 General dialog

In the General Dialog (settings) tab, it is possible to enable, disable or modify the parameters shown in Figure 4.1.

4.2.1 AW has COOL

This parameter enables or disables Control_ and Status_ communication objects related with Cool Mode. Please, check your system features in your AW user/installation manual to ensure that your climate system has this feature available and also to find more information for each function.

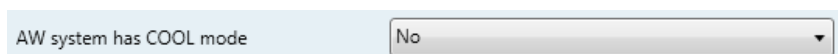


Figure 4.23 AW has cool mode parameter details

IMPORTANT: Values shown in the PA-AW-KNX-1 and in the Panasonic Control Panel may differ due to the non-synchronous behavior of the Panasonic Aquarea system.

This affects the following communication objects:

- Cooling Setpoint Temperature

Cool Mode

These communication objects allow controlling and monitoring the working mode of the AW unit providing the option to change from Cool to Heat mode and vice versa.

3 Control_Mode Cool [DPT_1.002] - 1-Set/0-Clear COOL mode
 4 Control_Mode Cool/Heat [DPT_1.100] - 0-Cooling;1-Heating
 20 Status_Mode Cool [DPT_1.002] - 1-Mode in COOL
 21 Status_Mode Cool/Heat [DPT_1.100] - 0-Cooling;1-Heating

Figure 4.24 Cool Mode communication objects

Cooling Setpoint Temperature

This Status_ communication object is used to indicate the cooling setpoint temperature. Value ranges may vary from 5°C to 20°C.

5 Control_Cooling Setpoint Temperature [DPT_9.001] - °C
 23 Status_Cooling Setpoint Temperature [DPT_9.001] - °C

Figure 4.25 Cooling setpoint temperature communication objects

4.2.2 AW has TANK

This parameter enables or disables Control_ and Status_ communication objects related with Cool Mode. Please, check your system features in your AW user/installation manual to ensure that your climate system has this feature available and also to find more information for each function.

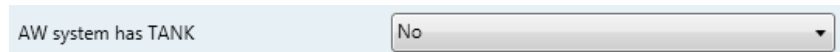


Figure 4.26 AW has tank mode parameter details

⚠ IMPORTANT: Values shown in the PA-AW-KNX-1 and in the Panasonic Control Panel may differ due to the non-synchronous behavior of the Panasonic Aquarea system.

This affects the following communication objects:

- Tank Setpoint Temperature

Tank On/Off

These Status_ and Control_ communication objects are used to indicate if the tank on the Aquarea system is On or Off and also to turn the tank On or Off.

- ➡ 6 Control_ Tank On/Off [DPT_1.001] - 0-Off;1-On
- ➡ 24 Status_ Tank On/Off [DPT_1.001] - 0-Off;1-On

Figure 4.27 Tank On/Off communication objects

Tank Setpoint Temperature

These Status_ and Control_ communication objects are used to set the tank setpoint temperature and also to monitor this value. Value ranges may vary from 40°C to 75°.

- ➡ 5 Control_ Tank Setpoint Temperature [DPT_9.001] - °C
- ➡ 25 Status_ Tank Setpoint Temperature [DPT_9.001] - °C

Figure 4.28 Tank setpoint temperature communication objects

Tank Water Temperature

This Status_ communication object is used to indicate the tank water temperature. Value ranges may vary from 0°C to 127°C.

- ➡ 26 Status_ Tank Water Temperature [DPT_9.001] - °C

Figure 4.29 Tank water temperature communication objects

Booster Status

This Status_ communication object is used to indicate if the booster is On or Off.

- ➡ 27 Status_ Booster Status [DPT_1.001] - 0-Off;1-On

Figure 4.30 Outlet water cooling setpoint communication objects

Warning Tank Temperature

This Status_ communication object is used to warn users about the temperature of the tank temperature.

■ 28 Status_ Warning Tank Temp. Status [DPT_1.005] - 0-No alarm;1-Alarm

Figure 4.31 Warning Tank Temperature communication object

4.2.3 AW has SOLAR PANEL

This parameter enables or disables Status_ communication object related with the SOLAR PANEL. Please, check your system features in your AW user/installation manual to ensure that your climate system has this feature available and also to find more information for each function.

■ 29 Status_ Solar Panel [DPT_1.001] - 0-Off;1-On

AW system has SOLAR PANEL	No
---------------------------	---------------------------------

Figure 4.32 AW has solar panel parameter and communication object details

5. Technical Specifications

Enclosure	ABS (UL 94 HB) de 2,5 mm thick
Dimensions	100 X 70 X 28 mm
Weight	70g
Color	Ivory White
Power supply	29V DC, 6mA (KNX bus)
Terminal wiring (for power supply and low-voltage signals)	Per terminal: solid wires or stranded wires (twisted or with ferrule) 1 core: 0.5mm ² ... 2.5mm ² 2 cores: 0.5mm ² ... 1.5mm ² 3 cores: not permitted
KNX port	1 x KNX TP1 (EIB) port opto-isolated. Plug-in terminal block (2 poles). TNV-1
AW connection	K1 (Aquarea unit) (4 x 0.22 - Shielded) K2 (Remote controller) (4 x 0.22 - Shielded)
LED indicators	1 x KNX programming.
Push buttons	1 x KNX programming.
Configuration	Configuration with ETS.
Op. Temperature	From 0°C to 40°C
Storage Temperature	From 0°C to 40°C
Operating Humidity	25-90% at 50°C, non-condensing
RoHS conformity	Compliant with RoHS directive (2002/95/CE).
Certifications	CE conformity to EMC directive (2004/108/EC) and Low-voltage directive (2006/95/EC) EN 61000-6-2; EN 61000-6-3; EN 60950-1; EN 50491-3; EN 50090-2-2; EN 50428; EN 60669-1; EN 60669-2-1;

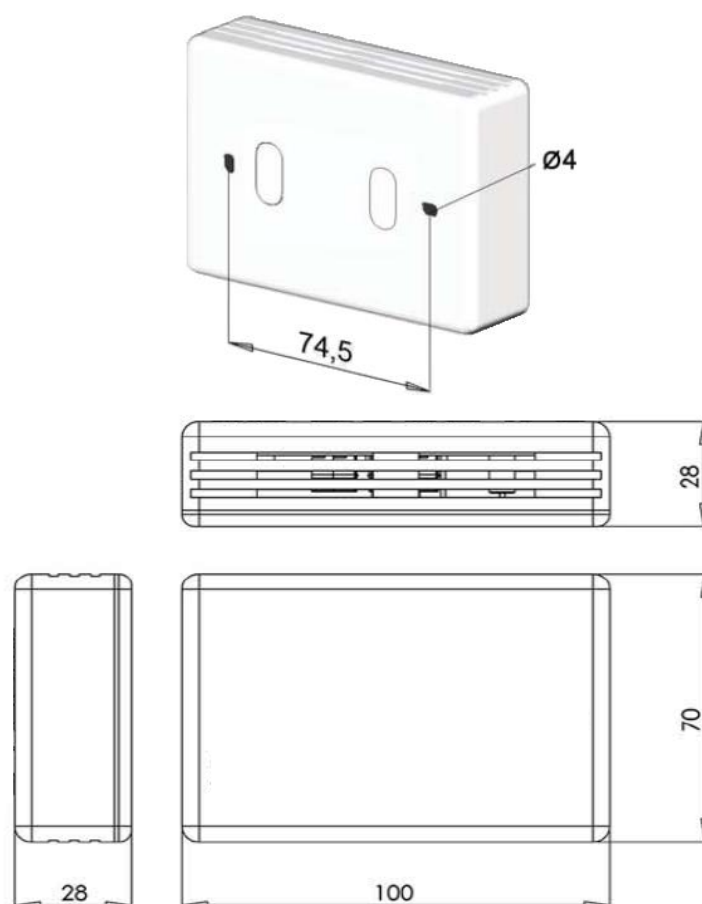


Figure 5.1 PA-AW-KNX-1 dimensions (mm)

6. Compatible Air-to-Water (A.W.) units

A list of Panasonic Aquarea unit model references, compatible with PA-AW-KNX-1 and their available features, can be found in:

http://www.intesis.com/pdf/IntesisBox_PA-AW-xxx-1_AW_Compatibility.pdf

7. Error Codes

KNX Error Code	Remote Controller Error Code	Error Description
000	H00	No abnormality detected
042	H12	Indoor / outdoor capacity unmatched
224	H15	Outdoor compressor temperature sensor abnormality
225	H23	Indoor refrigerant liquid temperature sensor abnormality
226	H24	Unknown
227	H38	Indoor / outdoor mismatch
232	H42	Compressor low pressure abnormality
228	H61	Unknown
229	H62	Water flow switch abnormality
230	H63	Refrigerant low pressure abnormality
231	H64	Refrigerant high pressure abnormality
236	H70	Indoor backup heater OLP abnormality
038	H72	Tank temperature sensor abnormality
156	H76	Indoor - control panel communication abnormality
020	H90	Indoor / outdoor abnormal communication
002	H91	Tank booster heater OLP abnormality
222	H95	Indoor / outdoor wrong connection
233	H98	Outdoor high pressure overload protection
036	H99	Indoor heat exchanger freeze prevention
193	F12	Pressure switch activate
195	F14	Outdoor compressor abnormal rotation
196	F15	Outdoor fan motor lock abnormality
197	F16	Total running current protection
200	F20	Outdoor compressor overheating protection
202	F22	IPM overheating protection
203	F23	Outdoor DC peak detection
204	F24	Refrigerant cycle abnormality
234	F25	Cooling / heating cycle changeover abnormality
205	F27	Pressure switch abnormality
208	F36	Outdoor air temperature sensor abnormality
209	F37	Indoor water inlet temperature sensor abnormality
013	F38	Unknown
212	F40	Outdoor discharge pipe temperature sensor abnormality
214	F41	PFC control
215	F42	Outdoor heat exchanger temperature sensor abnormality
216	F43	Outdoor defrost temperature sensor abnormality
210	F45	Indoor water outlet temperature sensor abnormality
207	F46	Outdoor current transformer open circuit
237	F48	Outdoor EVA outlet temperature sensor abnormality
238	F49	Outdoor bypass outlet temperature sensor abnormality
235	F95	Cooling high pressure overload protection
65535	N/A	Communication error between PA-AW-MBS-1 and the AW unit

In case you detect an error code not listed, please contact your nearest Panasonic support center to get more information about the meaning of the error.

Appendix A – Communication objects description table

Control Objects

SECTION	OBJECT NUMBER	NAME	LONG.	DATAPOINT TYPE		FLAGS				FUNCTION
				DPT_NAME	DPT_ID	R	W	T	U	
On / Off	0	Control_ On/Off	1 bit	DPT_Switch	1.001		W	T		0 - Off; 1-On
Mode	1	Control_ Quiet	1 bit	DPT_Switch	1.001		W	T		0 - Off; 1-On
	2	Control_ Mode Heat	1 bit	DPT_Bool	1.002		W	T		0 - Clear HEAT mode; 1 - Set HEAT mode
	3	Control_ Mode Cool	1 bit	DPT_Bool	1.002		W	T		0 - Clear COOL mode; 1 - Set COOL mode
	4	Control_ Mode Cool/Heat	1 bit	DPT_Heat/Cool	1.100		W	T		0 - Cooling; 1 - Heating;
	5	Control_ Cooling Setpoint Temperature	2 byte	DPT_Value_Temp	9.001		W	T		(°C)
Tank	6	Control_ Tank On/Off	1 bit	DPT_Switch	1.001		W	T		0 - Off; 1-On
	7	Control_ Tank Setpoint Temperature	2 byte	DPT_Value_Temp	9.001		W	T		(°C)
Outd.	8	Control_ Outd. Temp for low water temp	2 byte	DPT_Value_Temp	9.001		W	T		(°C)
	9	Control_ Outd. Temp for high water temp	2 byte	DPT_Value_Temp	9.001		W	T		(°C)
WS	10	Control_ Water temp at Low outd. temp	2 byte	DPT_Value_Temp	9.001		W	T		(°C)
	11	Control_ Water temp at High outd. temp	2 byte	DPT_Value_Temp	9.001		W	T		(°C)
Thermoshift	12	Control_ Outlet Water Current Thermoshift	2 byte	DPT_Value_Temp	9.001		W	T		(°C)
Op. Hours	13	Control_ Reset Comp Operating Hours	1 bit	DPT_Reset	1.015		W	T		1 - Reset
Reset	14	Control_ Reset Current Error	1 bit	DPT_Reset	1.015		W	T		1 - Reset
	15	Control_ Reset Error History	1 bit	DPT_Reset	1.015		W	T		1 - Reset
	16	Control_ Back to Factory Settings	1 bit	DPT_Reset	1.015		W	T		1 - Reset

Status Objects

SECTION	OBJET NUMBER	NAME	LONG.	DATAPOINT TYPE		FLAGS				FUNCTION
				DPT_NAME	DPT_I	R	W	T	U	
Mode	17	Status_ On/Off	1 bit	DPT_Switch	1.001	R		T		0 - Off; 1-On
Mode	18	Status_ Quiet	1 bit	DPT_Switch	1.001	R		T		0 - Off; 1-On
	19	Status_ Mode Heat	1 bit	DPT_Bool	1.002	R		T		0 - Clear HEAT mode; 1 – Set HEAT mode
	20	Status_ Mode Cool	1 bit	DPT_Bool	1.002	R		T		0 - Clear COOL mode; 1 – Set COOL mode
	21	Status_ Mode Cool/Heat	1 bit	DPT_Heat/Cool	1.100	R		T		0 - Cooling; 1 - Heating;
Outlet Water Heat/Cool	22	Status_ Cooling Setpoint Temperature	2 bytes	DPT_Value_Temp	9.001	R		T		(°C)
	23	Status_ Heating Setpoint Temperature	2 bytes	DPT_Value_Temp	9.001	R		T		(°C)
Tank	24	Status_ Tank On/Off	1 bit	DPT_Switch	1.001	R		T		0 - Off; 1-On
	25	Status_ Tank Setpoint Temperature	2 bytes	DPT_Value_Temp	9.001	R		T		(°C)
	26	Status_ Tank Water Temperature	2 bytes	DPT_Value_Temp	9.001	R		T		(°C)
	27	Status_ Booster Status	1 bit	DPT_Switch	1.001	R		T		0 - Off; 1-On
	28	Status_ Warning Tank Temp. Status	1 bit	DTP_Alarm	1.005	R		T		0 - No Alarm; 1 - Alarm
Solar Panel	29	Status_ Solar Panel	1 bit	DPT_Switch	1.001	R		T		0 - Off; 1-On
Outlet Water	30	Status_ Outlet Water Temp	2 bytes	DPT_Value_Temp	9.001	R		T		(°C)
Inlet Water	31	Status_ Inlet Water Temp	2 bytes	DPT_Value_Temp	9.001	R		T		(°C)
Exterior Temp.	32	Status_ Outdoor Temperature	2 bytes	DPT_Value_Temp	9.001	R		T		(°C)
Outd.	33	Status_ Outd. Temp for Low water temp	2 bytes	DPT_Value_Temp	9.001	R		T		(°C)
	34	Status_ Outd. Temp for High water temp	2 bytes	DPT_Value_Temp	9.001	R		T		(°C)
WS	35	Status_ Water temp at Low outd. temp	2 bytes	DPT_Value_Temp	9.001	R		T		(°C)
	36	Status_ Water temp at High outd. temp	2 bytes	DPT_Value_Temp	9.001	R		T		(°C)

Thermoshift	37	Status_ Water Current Thermoshift	2 bytes	DPT_Value_Temp	9.001	R		T	(°C)
Compressor	38	Status_ Compressor Frequency	4 bytes	DPT_Value_Frequency	14.033	R		T	(Hz)
	39	Status_ Compressor Operating Hours	2 bytes	DPT_TimePeriodHrs	7.007	R		T	(hours)
Errors / Alarms	40	Status_ Error/Alarm	1 bit	DTP_Alarm	1.005	R		T	0 - No Alarm; 1 - Alarm
	41	Status_ Current Error Code	2 bytes	Enumerated		R		T	0 - No Error; Any other see user's manual
	42	Status_ Current Error Code Text	14 bytes	DPT_String_8859_1	16.001	R		T	3 char PA Error; Empty - None
	43	Status_ Error Code History	2 bytes	Enumerated		R		T	0 - No Error; Any other see user's manual
	44	Status_ Error Code History Text	14 bytes	DPT_String_8859_1	16.001	R		T	3 char PA Error; Empty - None